MDB Series Dehumidifying Dryers
Operation and Installation Manual
Mechanical Edition

50, 100, 150, 255 CFM
(85, 170, 255, 380 M^3/hr)

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Use in Conjunction with:
MDB Electrical Manual: 882.02900.00
CDS Mechanical Manual: 882.02569.00 (If Applicable)

an ACS Group company

Write Down Your Serial Numbers Here For Future Reference:

_____ _____

_____ _____

_____ _____

We are committed to a continuing program of product improvement.
Specifications, appearance, and dimensions described in this manual are subject to change without notice.

DCN No. _____
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Shipping Info

Unpacking and Inspection

You should inspect the dehumidifying dryer for possible shipping damage.

Thoroughly check the equipment for any damage that might have occurred in transit, such as broken or loose wiring and components, loose hardware and mounting screws, etc.

In the Event of Shipping Damage

According to the contract terms and conditions of the Carrier, the responsibility of the Shipper ends at the time and place of shipment.

Notify the transportation company's local agent if you discover damage.

Hold the damaged goods and packing material for the examining agent's inspection. Do not return any goods before the transportation company's inspection and authorization.

File a claim with the transportation company. Substantiate the claim by referring to the agent's report. A certified copy of our invoice is available upon request. The original Bill of Lading is attached to our original invoice. If the shipment was prepaid, write us for a receipted transportation bill.

Advise customer service regarding your wish for assistance and to obtain an RMA (return material authorization) number.

If the Shipment is Not Complete

Check the packing list as back-ordered items are noted on the packing list. You should have:

- ☑ MDB Dehumidifying Dryer
- ☑ Bill of lading
- ☑ Packing list
- ☑ Operating and Installation packet
- ☑ Electrical schematic and panel layout drawings
- ☑ Component instruction manuals

Re-inspect the container and packing material to see if you missed any smaller items during unpacking.

If the Shipment is Not Correct

If the shipment is not what you ordered, **contact the shipping department immediately**. For immediate assistance, please contact the correct facility located in the technical assistance section of this manual. Have the order number and item number available. *Hold the items until you receive shipping instructions*.

Returns

Do not return any damaged or incorrect items until you receive shipping instructions from the shipping department.

Credit Returns

Prior to the return of any material **authorization** must be given by **the manufacturer.** A RMA number will be assigned for the equipment to be returned.

Reason for requesting the return must be given.

ALL returned material purchased from **the manufacturer** returned is subject to 15% ($75.00 minimum) restocking charge.

ALL returns are to be shipped prepaid.

The invoice number and date or purchase order number and date must be supplied.

No credit will be issued for material that is not within the manufacturer's warranty period and/or in new and unused condition, suitable for resale.

Warranty Returns

Prior to the return of any material, authorization must be given by **the manufacturer.** A RMA number will be assigned for the equipment to be returned.

Reason for requesting the return must be given.

All returns are to be shipped prepaid.

The invoice number and date or purchase order number and date must be supplied.

After inspecting the material, a replacement or credit will be given, at **the manufacturer's** discretion. If the item is found to be defective in materials or workmanship, and it was manufactured by our company**,** purchased components are covered under their specific warranty terms.

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Chapter 1: Safety

1-1 How to Use This Manual

Use this manual as a guide and reference for installing, operating, and maintaining the mid-sized dehumidifying dryer. The purpose is to assist you in applying efficient, proven techniques that enhance equipment productivity.

This manual covers only light corrective maintenance. No other maintenance should be undertaken without first contacting a service engineer.

The General Information section outlines models covered, standard features, and safety features. Additional sections within the manual provide instructions for installation, pre-operational procedures, preventive maintenance, and corrective maintenance.

The Installation chapter includes required data for receiving, unpacking, inspecting, and setup of the mid-sized dehumidifying dryer. We can also provide the assistance of a factory-trained technician to help train your operator(s) for a nominal charge. This section includes instructions, checks, and adjustments that should be followed before commencing with operation of the dryer. These instructions are intended to supplement standard shop procedures performed at shift, daily, and weekly intervals.

The Controls and Operations chapter, located in an accompanying manual, includes a description of electrical and mechanical controls, in addition to information for operating the dryer safely and efficiently.

The Maintenance chapter is intended to serve as a source of detailed assembly and disassembly instructions for those areas of the equipment requiring service. Preventive maintenance sections are included to ensure that the dehumidifying dryer provides excellent, long service.

The Troubleshooting chapter serves as a guide for identification of most common problems. Potential problems are listed, along with possible causes and related solutions.

The Appendix contains technical specifications, drawings, schematics, parts lists, and available options. A spare parts list with part numbers specific to your machine is provided with your shipping paperwork package. Refer to this section for a listing of spare parts for purchase. Have your serial number and model number ready when ordering.

Safety Symbols Used in this Manual

The following safety alert symbols are used to alert you to potential personal injury hazards. Obey all safety messages that follow these symbols to avoid possible injury or death.

DANGER indicates an imminently hazardous situation that, if not avoided, will result in death or serious injury.

WARNING indicates a potentially hazardous situation or practice that, if not avoided, could result in death or serious injury.

CAUTION indicates a potentially hazardous situation or practice that, if not avoided, may result in minor or moderate injury or in property damage.

Dryer Safety Tags

Hazard Alert Symbol	Description/Explanation	Preventative Maintenance
	High Voltage Hazard. The electrical enclosure is supplied with 3-phase electrical power. Use caution when using or maintaining this product.	Every six months inspect all electrical connections for secure attachment. For further information see the Maintenance Chapter in this manual.
	Auto start Hazard. Equipment may start at any time. Lock out/tag out before servicing the machine.	Every month inspect all electrical connections for secure attachment and that all warning labels are in place. For further information see the Maintenance Chapter in this manual.
	Hot Surface Hazard. When the unit operates above 212F (100C) the surface of the unit may reach excessive temperatures. Use caution when using or maintaining this product.	Every month check heater elements for continuity using an ohmmeter. For further information see the Maintenance Chapter in this manual.

Mandatory Symbol	Description/Explanation
	Read Operators Manual. This equipment must be operated and maintained by properly trained personnel. The information contained within this manual must be read and understood prior to operating this equipment.
	Lock Out. This equipment is operated with 3-phase electrical power. Therefore, when performing any maintenance operations we recommend following the local standards for performing a lock-out/tag-out procedure.
	Prohibition Symbol. Do not reach into any of the equipment while the equipment is running and/or the power is on. Lock out all power before performing maintenance on the machine(s).

1-2 Warnings and Precautions

Our equipment is designed to provide safe and reliable operation when installed and operated within design specifications, following national and local safety codes. This may include, but is not limited to OSHA, NEC, CSA, SPI, and any other local, national and international regulations.

To avoid possible personal injury or equipment damage when installing, operating, or maintaining this equipment, use good judgment and follow these safe practices:

- ☑ **Read and follow these operation and installation instructions when installing, operating, and maintaining this equipment. If these instructions become damaged or unreadable, additional copies are available from the manufacturer.**

- ☑ Follow all **SAFETY CODES**.
- ☑ Wear **SAFETY GLASSES** and **WORK GLOVES**.
- ☑ Work only with approved tools and devices.
- ☑ Disconnect and/or lock out power before servicing or maintaining the equipment.
- ☑ Use care when **LOADING, UNLOADING, RIGGING**, or **MOVING** this equipment.

- ☑ Operate this equipment within design specifications.
- ☑ **OPEN, TAG**, and **LOCK ALL DISCONNECTS** before working on equipment. You should remove the fuses and carry them with you.
- ☑ Make sure the equipment and components are properly **GROUNDED** before you switch on power.
- ☑ When welding or brazing in or around this equipment, make sure **VENTILATION** is **ADEQUATE. PROTECT** adjacent materials from flame or sparks by shielding with sheet metal. An approved **FIRE EXTINGUISHER** should be nearby and ready for use if needed.
- ☑ Do not restore power until you remove all tools, test equipment, etc., and the equipment and related components are fully reassembled.
- ☑ Only **PROPERLY TRAINED** personnel familiar with the information in this manual should work on this equipment.

We have long recognized the importance of safety and have designed and manufactured our equipment with operator safety as a prime consideration. We expect you, as a user, to abide by the foregoing recommendations in order to make operator safety a reality.

1-3 Responsibility

These machines are constructed for maximum operator safety when used under standard operating conditions and when recommended instructions are followed in the maintenance and operation of the machine.

All personnel engaged in the use of the machines should become familiar with their operation as described in this manual.

Proper operation of the machine promotes safety for the operator and all workers in its vicinity.

Each individual must take responsibility for observing the prescribed safety rules as outlined. All warning and danger signs must be observed and obeyed. All actual or potential danger areas must be reported to your immediate supervisor.

General Responsibility

No matter who you are, safety is important. Owners, operators and maintenance personnel must realize that every day, safety is a vital part of their jobs.

If your main concern is loss of productivity, remember that production is always affected in a negative way following an accident. The following are some of the ways that accidents can affect your production:

- Loss of a skilled operator (temporarily or permanently)
- Breakdown of shop morale
- Costly damage to equipment
- Downtime

An effective safety program is responsible and economically sound.

Organize a safety committee or group, and hold regular meetings. Promote this group from the management level. Through this group, the safety program can be continually reviewed, maintained, and improved. Keep minutes or a record of the meetings.

Hold daily equipment inspections in addition to regular maintenance checks. You will keep your equipment safe for production and exhibit your commitment to safety.

Please read and use this manual as a guide to equipment safety. This manual contains safety warnings throughout, specific to each function and point of operation.

Operator Responsibility

The operator's responsibility does not end with efficient production. The operator usually has the most daily contact with the equipment and intimately knows its capabilities and limitations.

Plant and personnel safety is sometimes forgotten in the desire to meet incentive rates, or through a casual attitude toward machinery formed over a period of months or years. Your employer probably has established a set of safety rules in your workplace. Those rules, this manual, or any other safety information will not keep you from being injured while operating your equipment.

Learn and always use safe operation. Cooperate with co-workers to promote safe practices. Immediately report any potentially dangerous situation to your supervisor.

- **NEVER** place your hands or any part of your body in any dangerous location.
- **NEVER** operate, service, or adjust the dryer without appropriate training and first reading and understanding this manual.

- **NEVER** try to pull material out of the dryer with your hands while it is running!
- Before you start the dehumidifying dryer, check the following:
    - Remove all tools from the dryer;
    - Be sure no objects (tools, nuts, bolts, clamps, bars) are laying in the area;
- If your dryer has been inoperative or unattended, check all settings before starting.
- At the beginning of your shift and after breaks, verify that the controls and other auxiliary equipment are functioning properly.
- Keep all safety guards in place and in good repair. **NEVER** attempt to bypass, modify, or remove safety guards. Such alteration is not only unsafe, but will void the warranty on your equipment.
- When changing control settings to perform a different mode of operation, be sure selector switches are correctly positioned. Locking selector switches should only be adjusted by authorized personnel and the keys removed after setting.
- Report the following occurrences **IMMEDIATELY:**
    - unsafe operation or condition
    - unusual dryer action
    - leakage
    - improper maintenance
    - **NEVER** stand or sit where you could slip or stumble into the dehumidifying dryer while working on it.
- **DO NOT** wear loose clothing or jewelry, which can be caught while working on the dryer. In addition, cover or tie back long hair.
- Clean the dehumidifying dryer and surrounding area **DAILY**, and inspect the machine for loose, missing or broken parts.
- Shut off power to the dryer when it is not in use. Turn the switch to the **OFF** position, or unplug it from the power source.

Maintenance Responsibility

Proper maintenance is essential to safety. If you are a maintenance worker, you must make safety a priority to effectively repair and maintain equipment.

Before removing, adjusting, or replacing parts on a machine, remember to turn off all electric supplies and all accessory equipment at the machine, and disconnect and lockout electrical and pneumatic power. Attach warning tags to the disconnect switch and air shutoff valve.

⚠CAUTION

When you need to perform maintenance or repair work on a dehumidifying dryer above floor level, use a solid platform or a hydraulic elevator. If there is a permanently installed catwalk on your dryer, use it. The work platform should have secure footing and a place for tools and parts. **DO NOT** climb on the dehumidifying dryer, machines, or work from ladders.

If you need to repair a large component, use appropriate handling equipment. Before you use handling equipment (portable "A" frames, electric boom trucks, fork trucks, overhead cranes) be sure the load does not exceed the capacity of the handling equipment or cause it to become unstable.

Carefully test the condition of lifting cables, chains, ropes, slings, and hooks before using them to lift a load.

Be sure that all non-current carrying parts are correctly connected to earth ground with an electrical conductor that complies with current codes. Install in accordance with national and local codes.

When you have completed the repair or maintenance procedure, check your work and remove your tools, rigging, and handling equipment.

Do not restore power to the dehumidifying dryer until all persons are clear of the area. **DO NOT** start and run the dryer until you are sure all parts are functioning correctly.

BEFORE you turn the dehumidifying dryer over to the operator for production, verify all enclosure panels, guards and safety devices are in place and functioning properly.

Reporting a Safety Defect

If you believe that your equipment has a defect that could cause injury, you should immediately discontinue its use and inform the manufacturer.

The principle factors that can result in injury are failure to follow proper operating procedures (i.e. lockout/tagout), or failure to maintain a clean and safe working area.

Chapter 2: General Information

2-1 Models Covered in This Manual

This manual provides operation, installation, and maintenance instructions for 50, 100, 150 and 225 cfm Dehumidifying Dryers with DryPro control. Model numbers are listed on the serial tag. Make sure you know the model and serial number of your equipment before contacting the manufacturer for parts or service.

Our dehumidifying dryers are designed to generate heated, dehumidified air at carefully controlled temperatures for use in closed-loop plastic drying systems. Moisture removal from hygroscopic (moisture attracting) plastic pellets is an essential step in the manufacture of high-quality plastic products. Our dehumidifying dryers are used to generate very low dew point air heated to a controlled temperature for drying plastic pellets and regrind.

		MDB 85	MDB 170	MDB 255	MDB 380
Process air flow, cfm (m^3/hr)		50 (85)	100 (170)	150 (250)	225 (380)
Hose conn. dia., in. (mm)		2.5 (64)	2.5 (64)	3 (75)	3 (75)
Temp. range, °F (°C)		140-400 (60-204)	140-400 (60-204)	185-400 (85-204)	160-400 (71-204)
FLA	460/3/60	12	19	31	44
Running Amps		10	15	25	36
FLA	230/3/60	24	38	61	88
Running Amps		19	30	49	70
Process blower, hp (kW)		0.75 (0.6)	1 (0.75)	4 (3)	5 (3.73)
Regen. blower, hp (kW)		0.33 (0.25)	0.33 (0.25)	0.5 (0.37)	0.5 (0.37)
Length, in. (mm)		27 (686)	27 (686)	37 (940)	37 (940)
Width, in. (mm)		27 (711)	27 (686)	37 (940)	37 (940)
Height, in. (mm)		68 (1727)	68 (1727)	79 (2006)	87 (2210)
Shipping weight, lbs. (kgs.)		440 (200)	475 (216)	750 (340)	850 (386)

2-2 Necessary Documents

The documents listed below are necessary for the operation, installation, and maintenance of MDB Series dehumidifying dryers. You can obtain additional copies from the manufacturer. **Make sure that the appropriate personnel are familiar with these documents:**

- ☑ This manual.
- ☑ MDB Electrical Manual #882.02900.00
- ☑ The schematic and assembly drawings included in the customer information packet.
- ☑ The Customer Parts List included in the information packet.
- ☑ Operation and installation manuals for any optional controls or auxiliary equipment in the drying system.

2-3 General Description

Moisture removal from hygroscopic (moisture attracting) plastic pellets is an essential step in the manufacture of high-quality plastic products.

Our Dehumidifying Dryers are used by the plastics industry to generate very low dewpoint air that is heated to a controlled temperature for drying plastic pellets and regrind.

The drying system consists of a dry air source and drying hoppers with process heating controls. The dry air source controls two primary sub-systems, the process air and the regeneration circuit. Each dryer has a left and a right desiccant bed so that one bed can regenerate while the other is in use.

The drying system can be configured for one drying hopper or for as many as 3 hoppers. The process air heater can be located on the dryer (single hopper only) or on each individual drying hopper. Heaters that are located on the drying hoppers have their own independent controls.

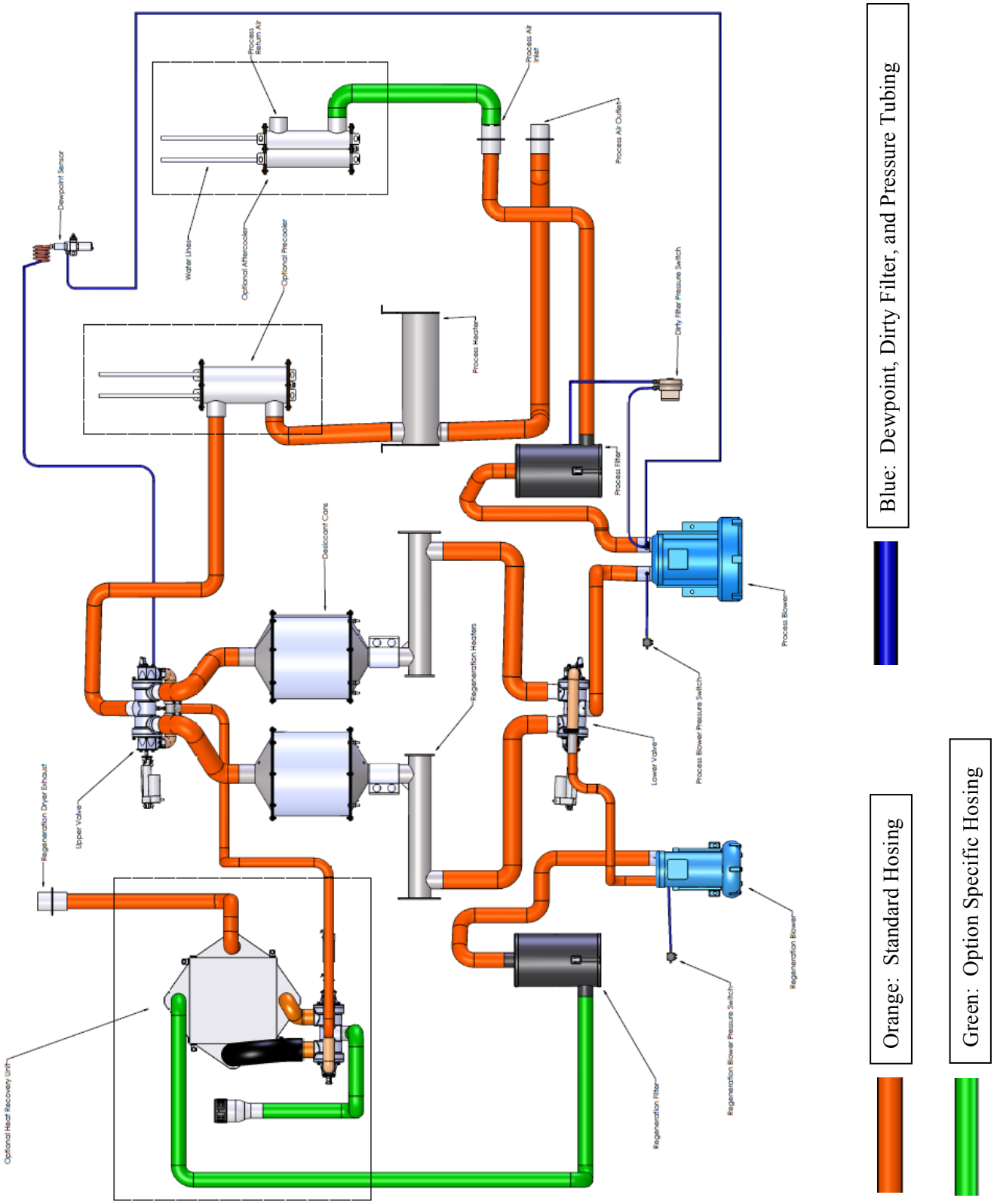
The Drying System

Dehumidifying dryers force hot, dry air through the resin in the drying hopper where the air picks up moisture from the material and is drawn back to the dryer.

In the dryer, a desiccant bed strips moisture from the air. The dryer then re-heats dried process air, and sends it back into the drying hopper to dry material again.

This system is a closed loop, because ambient (outside) air is never introduced into the process air. See Figure 1. Our dehumidifying dryers use the closed loop system, because the process air is typically much drier than ambient air, even after carrying moisture out of the plastic resin. Recycling process air maintains drying efficiency at a consistently high level.

MDB Airflow Schematic



Specifying a Drying System

There were many variables considered in the selection of your drying system, including: type of materials, residence time, throughput of the extruder or injection molding machine, ambient air moisture and temperature, and the altitude at the processing site. Should your operating environment change, we can advise you on necessary equipment, process time and temperature modifications.

What is Desiccant?

Desiccant is a material that attracts and holds (absorbs) water from the air. The desiccant our dryers use is a synthetic crystalline metal aluminosilicate that is blended with a clay binder and formed into beads.

Absorbed water is driven from saturated desiccant by heating it to a high temperature (reducing the desiccant's capacity to hold water) and forcing air through it. This moisture removal process is called "regeneration".

The Process/Regeneration Cycle

Our dehumidifying dryers have two desiccant beds. While one bed is on-line in the process air loop, the other is off-line being regenerated.

When a desiccant bed is on-line, it absorbs moisture from the process air. In time, the bed becomes saturated with moisture and needs to be regenerated. The dryer automatically redirects the process airflow to the second bed and starts the regeneration cycle on the first bed.

During regeneration, the dryer heats air to over 500°F (260ºC) and forces it through the desiccant bed. Moisture driven off the bed bleeds to the atmosphere.

If you measure the temperature of the air bled to the atmosphere (bleed temperature), you should observe a rise after a period of time. This condition, *bed breakthrough* or bed break, indicates that the bed is dry. At bed breakthrough, the bleed air temperature peaks between 350°F (176ºC) and 400°F (204ºC). After bed breakthrough the desiccant is hot and needs to be cooled down to avoid a temperature spike when the beds are switched.

The Dew Point meter measures the dew point of the process air. A properly regenerated bed produces process air dew point of -40°F (-40ºC) or lower. This ultra-low humidity level is more than adequate to dry plastics to as little as .003% moisture, depending on the process, material, and ambient conditions.

Aftercoolers, Pre-Coolers, and Plasticizing Traps

These dehumidifying dryers force hot, dry air through the resin in the drying hopper, where the High temperature applications (250°F to 400°F / 121°C to 204°C) require aftercoolers to cool moist air returning to the dryer from the drying hopper. An aftercooler cools the return air by 100°F (38°C); this maintains dryer efficiency and condenses unwanted plasticizers from the air-stream. Heat Exchangers are also required (called pre-coolers) when processing materials that have low drying temperatures (typically 120° F to 180° F / 49° C to 82° C). Check your specific dryer model technical specifications for actual requirements. Some models have a minimum low end temperature range that will determine actual requirements.

NOTICE

Optional Plasticizer Trap:

- **Plasticizer traps should be used when resins are processed in the family of acetates, butyrates and/or propionates. They should also be used when any resin (when dried) is known to produce residue, contaminates or volatiles. This contaminate is trapped in the air stream and is carried back from the drying process as the air leaves the drying hopper.**

- **The plasticizer trap will condense the contaminate that is in the air stream and remove it before it enters the dryer unit. If this contaminant is not removed, it can foul the desiccant beds and damage mechanical components in the dryer and in the drying process**

- **Review your process and confirm with your resin supplier if this will be an issue. If it is, a Plasticizer trap must be used or it will void the warranty on the dryer.**

Closed Loop and Heat Recovery Option

After bed breakthrough (see Process/Regeneration Cycle) the desiccant is hot and needs to be cooled down to avoid a temperature spike when the beds are switched. Instead of using ambient air to cool down the desiccant, the closed loop option recirculates a portion of the dry air from the desiccant bed currently on-line for the process. This approach avoids introducing moisture from the ambient air normally used to cool down the desiccant, also referred to as “pre-loading”. This option may be required for high humidity environments.

The closed loop option may use an air to air or a water to air heat exchanger to cool the air before it passes through the desiccant. If a water to air heat exchanger is used then a water source is required.

The heat recovery option utilizes an air to air heat exchanger to pull heat from the exhaust of the regeneration cycle that would otherwise have been wasted. The recovered heat is then used to pre-heat the air in the regeneration cycle before it reaches the regeneration heaters reducing the amount of energy required to heat the air which translates to higher efficiency and lower operating costs.

Safety Circuit Standards

Safety circuits used in industrial systems protect the operator and maintenance personnel from dangerous energy. They also provide a means of locking out or isolating the energy for servicing equipment.

Various agencies have contributed to the establishment of safety standards that apply to the design and manufacture of automated equipment. The Occupational Safety and Health Administration (OSHA) and the National Fire Protection Agency (NFPA 70&79) are just a few of the organizations that have joined with the plastics industry to develop safety standards.

Every effort has been made to incorporate these standards into the design of the MDB dehumidifying dryer; however, it is the responsibility of the personnel operating and maintaining the equipment to familiarize themselves with the safety procedures and the proper use of any safety devices.

Fail Safe Operation

If a safety device or circuit should fail, the design must be such that the failure causes a "Safe" condition.

Always disconnect and lockout all electrical power and pneumatic (i.e. compressed air) sources prior to servicing or cleaning the dehumidifying dryer. Failure to do so may result in serious injury. No one but the person who installed the lockout may remove it.

2-4 Standard Features

Mechanical Features

- ☑ Rugged compact frame with sturdy 4" (10cm) casters
- ☑ Dual blower dryer with dual desiccant beds and electrically actuated valves
- ☑ 180ºF – 300ºF (150ºC) standard drying temperature range
- ☑ High regeneration temperature control safeties
- ☑ 13X desiccant (molecular sieve)
- ☑ Easy to access process and regeneration air filters
- ☑ High pressure centrifugal blower
- ☑ Dew point +55º F to –60º F (13º C to -51.1º C)
- ☑ Dirty Filter Alarm for the Process Filter

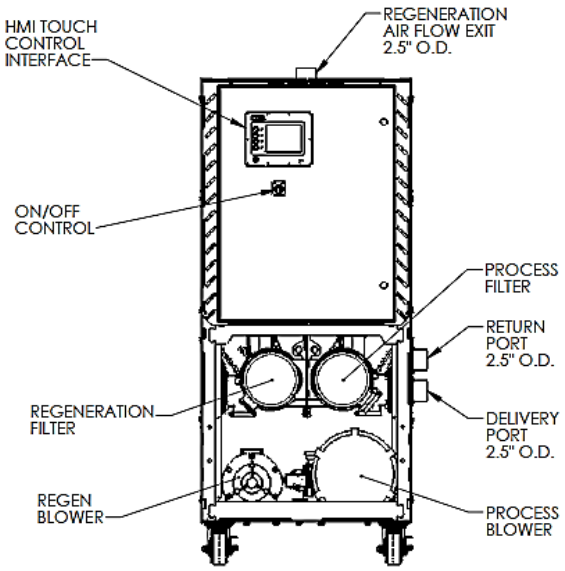
2-5 Options

Options can tailor your dehumidifying dryer system to meet the exact requirements of the drying task being performed.

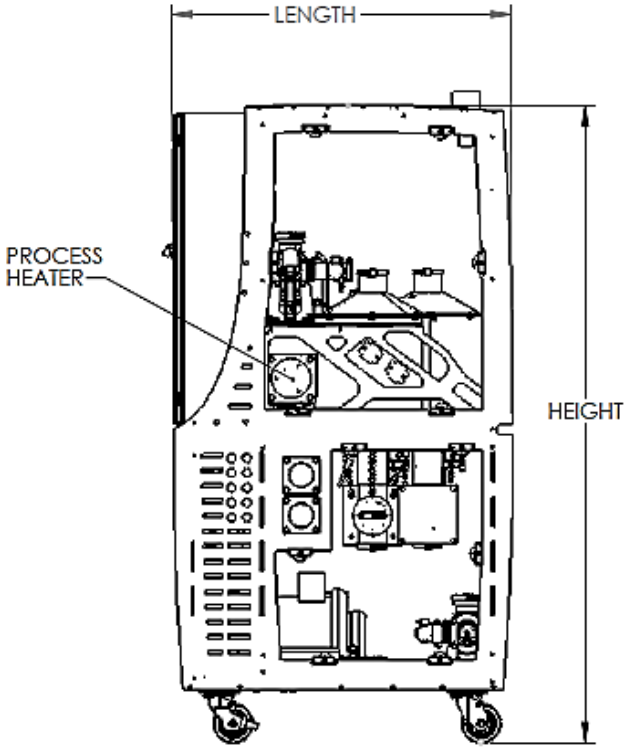
- ☑ Aftercoolers and Pre-coolers for high and low temperature applications.
- ☑ Audible/visual critical alarm.
- ☑ Dirty Filter indicator for the Regen blower.
- ☑ Modular hopper stands, hopper banks, and convey systems.
- ☑ Closed loop regeneration and heat recovery system
- ☑ Insulated dryer hose
- ☑ Plasticizer Trap (Requires Aftercooler)

2-6 Dimensions and Specifications

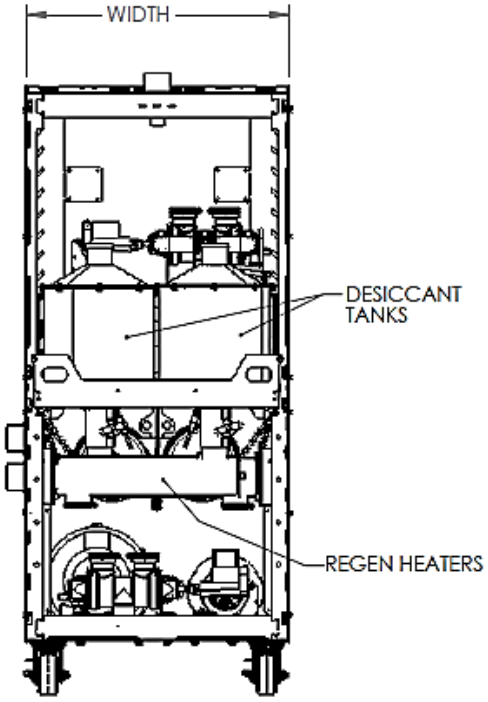
MDB 85



FRONT VIEW
ACCESS DOOR REMOVED



SIDE VIEW
ACCESS DOORS REMOVED



REAR VIEW
ACCESS DOORS REMOVED

PERFORMANCE AND POWER	
AIRFLOW	50 CFM (85m³/hr.)
PROCESS SUPPLY TEMPERATURE RANGE	140°F-400°F(60°C-204°C)
AMBIENT TEMPERATURE RANGE	70°F (21°C)
PROCESS MEDIA	AIR
PROCESS BLOWER	.75 hp (.56 kw)
REGENERATON BLOWER	.33 hp (.25 kw)
PROCESS HEATER	1 HTR @ (9 kw)
REGENERATION HEATER	(2 HTRS @ 3.5kw= 7kw)
PROCESS FILTER RATING	1.0 MICRON
REGENERATION FILTER RATING	1.0 MICRON
SOUND LEVEL AVERAGE	83-85 Dba
STANDARD HOSE CONNECTION DIA.	2.5in (63.5mm)

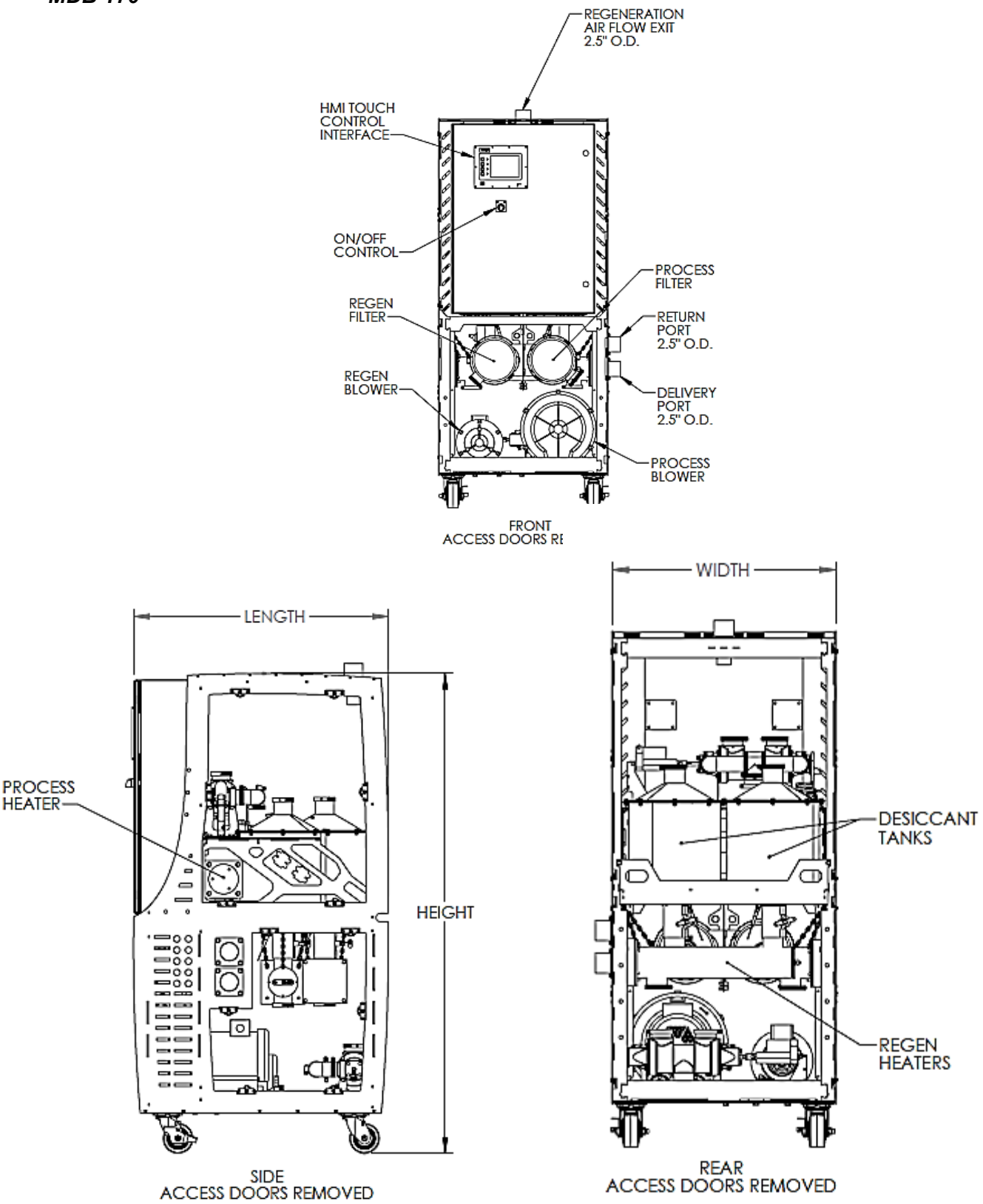
DIMENSIONS AND WEIGHT	
LENGTH	34in (864 mm)
WIDTH	28in (711 mm)
HEIGHT	64.5in (1638 mm)
APPROX. SHIPPING WEIGHT	440 lbs (200 kg)

ELECTRICAL MECHNICAL	
CONTROL CIRCUIT	120VAC/24VDC
CONTROL TYPE	PLC
CONTROL INTERFACE	HMI TOUCH
ELECTRICAL ENCLOSURE	NEMA12

DRYER AMP DRAW	
STANDARD VOLTAGE (LOW HEAT AND HIGH HEAT)	FULL LOAD AMPS/ OPERATING RUNNING AMPS *
208V/3/60Hz	42.2A/33.8A
220V/3/50Hz	39.9A/31.9A
230V/3/60Hz	38.9A/30.6A
400V/3/50Hz	22.0A/17.7A
460V/3/60Hz	19.1A/15.3A
575V/3/60Hz	14.9 A/11.9A

*APPROXIMATE VALUE BASED ON TYPICAL OPERATING LOAD. VALUES COULD BE LESS.

MDB 170


REGENERATION
AIR FLOW EXIT
2.5" O.D.
HMI TOUCH
CONTROL
INTERFACE
ON/OFF
CONTROL
PROCESS
FILTER
REGEN
FILTER
RETURN
PORT
2.5" O.D.
REGEN
BLOWER
DELIVERY
PORT
2.5" O.D.
PROCESS
BLOWER
FRONT
ACCESS DOORS RE
WIDTH
LENGTH
PROCESS
HEATER
HEIGHT
DESICCANT
TANKS
REGEN
HEATERS
SIDE
ACCESS DOORS REMOVED
REAR
ACCESS DOORS REMOVED

PERFORMANCE AND POWER	
AIRFLOW	100 CFM (170 m³/hr.)
PROCESS SUPPLY TEMPERATURE RANGE	140°F-400°F(60°C-204°C)
AMBIENT TEMPERATURE RANGE	70°F (21°C)
PROCESS MEDIA	AIR
PROCESS BLOWER	1.0 hp (.75 kw)
REGENERATON BLOWER	.33 hp (.25 kw)
PROCESS HEATER	(1 HTR @ 9 kw)
REGENERATION HEATER	(2 HTRS @3.5kw = 7kw)
PROCESS FILTER RATING	1.0 MICRON
REGENERATION FILTER RATING	1.0 MICRON
SOUND LEVEL AVERAGE	83-85 Dba
STANDARD HOSE CONNECTION DIA.	2.5 in. (63.5mm)

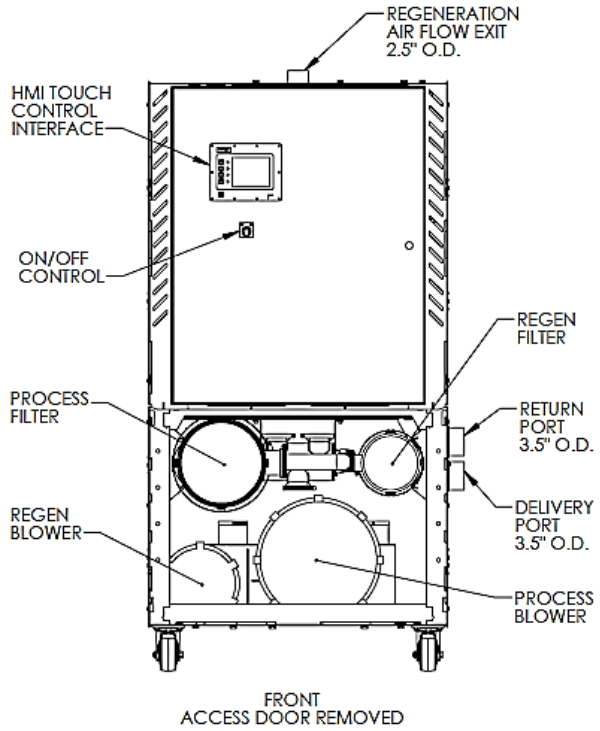
DIMENSIONS AND WEIGHT	
LENGTH	34 in (864 mm)
WIDTH	28 in (711 mm)
HEIGHT	64.5 (1638 mm)
APPROX. SHIPPING WEIGHT	475 LBS (216 KG)

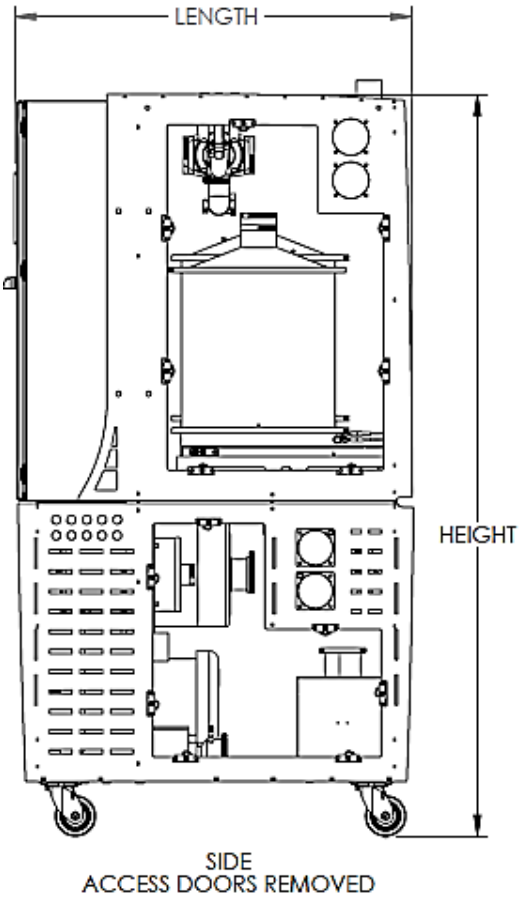
ELECTRICAL MECHNICAL	
CONTROL CIRCUIT	120VAC/24VDC
CONTROL TYPE	PLC
CONTROL INTERFACE	HMI TOUCH
ELECTRICAL ENCLOSURE	NEMA12

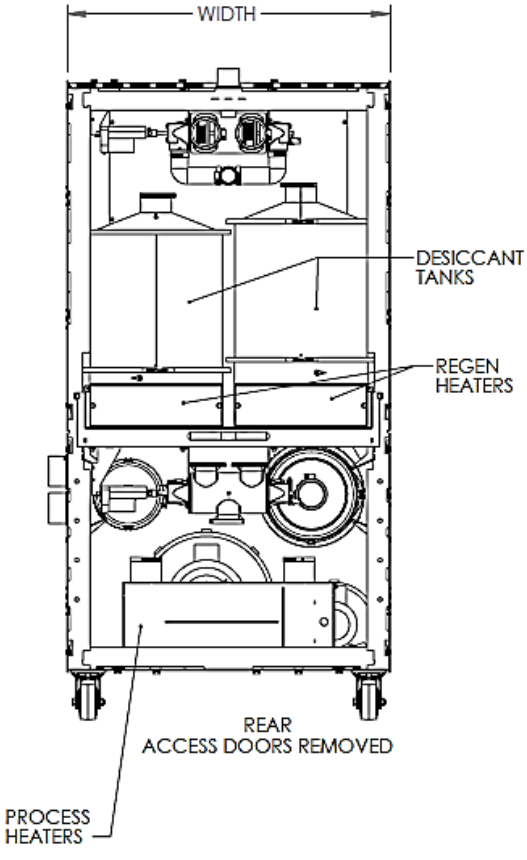
DRYER AMP DRAW	
STANDARD VOLTAGE (LOW HEAT AND HIGH HEAT)	FULL LOAD AMPS/ OPERATING RUNNING AMPS *
208V/3/60Hz	44.1A/35.3A
220V/3/50Hz	41.7A/33.4A
230V/3/60Hz	39.9A/31.9A
400V/3/50Hz	22.9A/28.4A
460V/3/60Hz	20.0A/16.0A
575V/3/60Hz	16.0A/12.8A

*APPROXIMATE VALUE BASED ON TYPICAL OPERATING LOAD. VALUES COULD BE LESS.

MDB 255


REGENERATION
AIR FLOW EXIT
2.5" O.D.
HMI TOUCH
CONTROL
INTERFACE
ON/OFF
CONTROL
REGEN
FILTER
PROCESS
FILTER
RETURN
PORT
3.5" O.D.
DELIVERY
PORT
3.5" O.D.
REGEN
BLOWER
PROCESS
BLOWER
FRONT
ACCESS DOOR REMOVED


LENGTH
HEIGHT
SIDE
ACCESS DOORS REMOVED


WIDTH
DESICCANT
TANKS
REGEN
HEATERS
REAR
ACCESS DOORS REMOVED
PROCESS
HEATERS

PERFORMANCE AND POWER	
AIRFLOW	150 CFM (255 m³/hr.)
PROCESS SUPPLY TEMPERATURE RANGE	160°F-400°F(71°C-204°C)
AMBIENT TEMPERATURE RANGE	70°F (21°C)
PROCESS MEDIA	AIR
PROCESS BLOWER	4.0 hp (3.0 kw)
REGENERATON BLOWER	0.5 hp (38 kw)
PROCESS HEATER	(4 HTRS @ 3.5kw = 14kw)
REGENERATION HEATER	(4 HTRS @ 3.5 kw = 14 kw)
PROCESS FILTER RATING	1.0 MICRON
REGENERATION FILTER RATING	1.0 MICRON
SOUND LEVEL AVERAGE	83-85 Dba
STANDARD HOLE CONNECTION DIA.	3.5 in. (89mm)

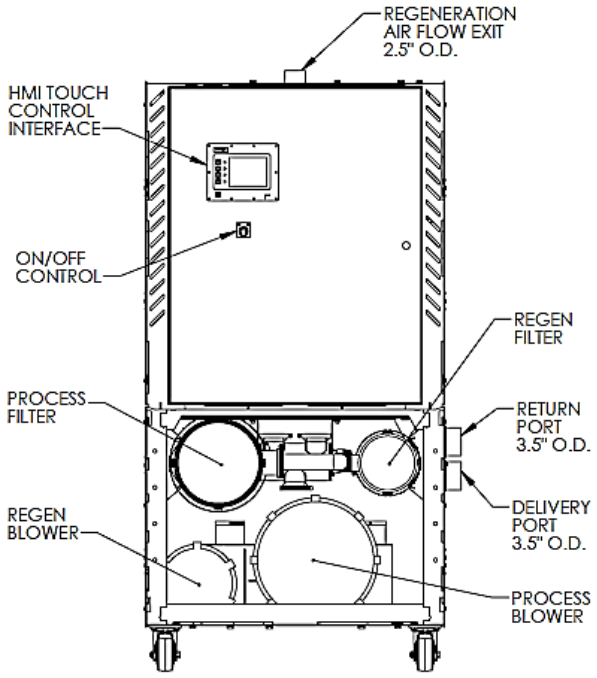
DIMENSIONS AND WEIGHT	
LENGTH	39 in (991 mm)
WIDTH	37 in (940 mm)
HEIGHT	73 (1854 mm)
APPROX. SHIPPING WEIGHT	750 LBS (341 kg)

ELECTRICAL MECHNICAL	
CONTROL CIRCUIT	120VAC/24VDC
CONTROL TYPE	PLC
CONTROL INTERFACE	HMI TOUCH
ELECTRICAL ENCLOSURE	NEMA12

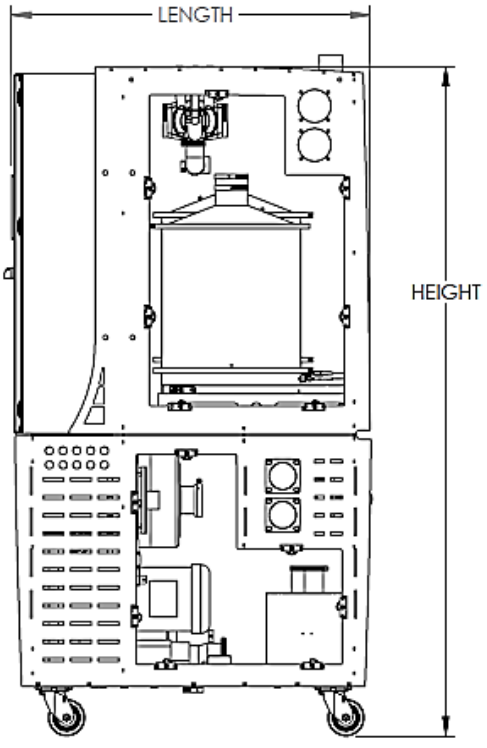
DRYER AMP DRAW	
STANDARD VOLTAGE (LOW HEAT AND HIGH HEAT)	FULL LOAD AMPS/ OPERATING RUNNING AMPS *
208V/3/60Hz	74.9A/59.9 A
220V/3/50Hz	70.9/56.7A
230V/3/60Hz	67.8A/54.2A
400V/3/50Hz	39.0A/31.2A
460V/3/60Hz	33.9/27.1A
575V/3/60Hz	33.0A/26.4A

*APPROXIMATE VALUE BASED ON TYPICAL OPERATING LOAD. VALUES COULD BE LESS.

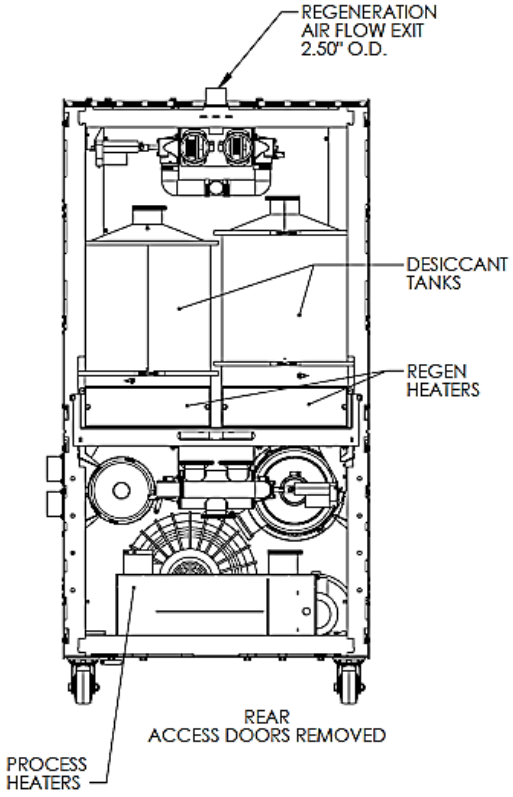
MDB 380



FRONT
ACCESS DOOR REMOVED



SIDE
ACCESS DOORS REMOVED



REAR
ACCESS DOORS REMOVED

PERFORMANCE AND POWER	
AIRFLOW	225 CFM (380 m³/hr.)
PROCESS SUPPLY TEMPERATURE RANGE	160°F-400°F(71°C-204°C)
AMBIENT TEMPERATURE RANGE	70°F (21°C)
PROCESS MEDIA	AIR
PROCESS BLOWER	5.0 hp (3.73 kw)
REGENERATON BLOWER	0.5 hp (.37 kw)
PROCESS HEATER	(4 HTRS @ 5.0 kw = 20 kw)
REGENERATION HEATER	(4 HTRS @ 3.5 kw= 14 kw)
PROCESS FILTER RATING	1.0 MICRON
REGENERATION FILTER RATING	1.0 MICRON
SOUND LEVEL AVERAGE	83-85 Dba
STANDARD HOLE CONNECTION DIA.	3.5 in. (89mm)

DIMENSIONS AND WEIGHT	
LENGTH	39 in (991 mm)
WIDTH	37 in (940 mm)
HEIGHT	73 (1854 mm)
APPROX. SHIPPING WEIGHT	850 LBS (386 kg)

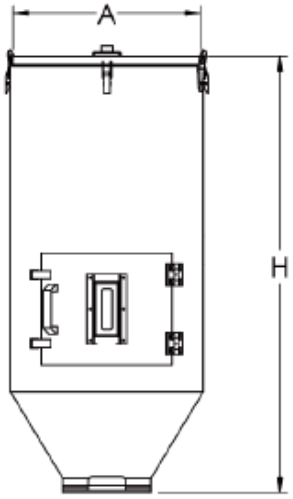
ELECTRICAL MECHNICAL	
CONTROL CIRCUIT	120VAC/24VDC
CONTROL TYPE	PLC
CONTROL INTERFACE	HMI TOUCH
ELECTRICAL ENCLOSURE	NEMA12

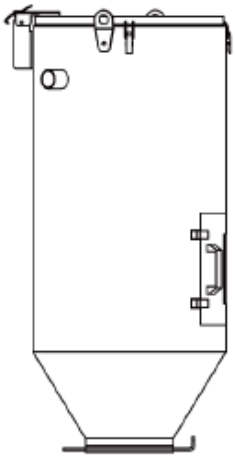
DRYER AMP DRAW	
STANDARD VOLTAGE (LOW HEAT AND HIGH HEAT)	FULL LOAD AMPS/ OPERATING RUNNING AMPS *
208V/3/60Hz	95.7A /76.6 A
220V/3/50Hz	90.5A /72.4 A
230V/3/60Hz	88.6 A /69.3A
400V/3/50Hz	49.8A /39.8A
460V/3/60Hz	43.3A /34.6A
575V/3/60Hz	33.0A /28.0A

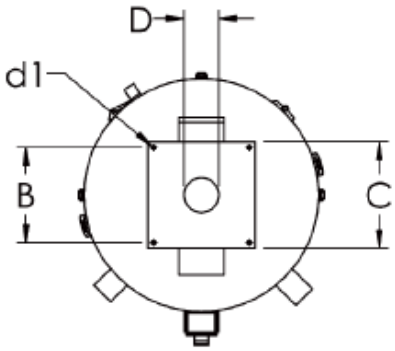
*APPROXIMATE VALUE BASED ON TYPICAL OPERATING LOAD. VALUES COULD BE LESS.

2-7 WH Series Drying Hoppers

Model Without Access Door	Capacity, cu.ft. (liters)	Insulation, in (mm)	Weight, lbs. (kgs.)
WH30	1.06 (30)	60 (2.36)	22 (48.50)
WH50	1.77 (50)		25 (55)
Model With Access Door	**Capacity, cu.ft. (liters)**	**Insulation, in (mm)**	**Weight, lbs. (kgs.)**
WH75	2.65 (75)	60 (2.36)	45 (99.21)
WH100	3.50 (100)		50 (110.23)
WH150	5.30 (150)		75 (165.35)
WH200	7.06 (200)		90 (198.42)
WH300	10.60 (300)		155 (341.72)
WH400	14.13 (400)		170 (374.79)
WH600	23.62 (600)		190 (418.88)
WH800	31.50 (800)		210 (462.97)







Model	A in (mm)	H in (mm)	d in (mm)	B in (mm)	d1(N x) in (mm)	C in (mm)	D in (mm)	I in (mm)	d2 (N x) in (mm)
WH30	17.20 (437)	27 (686)	1.97 (50)	6.10 (155)	4 x 0.51 (13)	3.53 (185)	2.36 (60)	11.02 (280)	4 x M6
WH50		35.66 (906)							
With Access Door	**A in (mm)**	**H in (mm)**	**d in (mm)**	**B in (mm)**	**d1(N x) in (mm)**	**C in (mm)**	**D in (mm)**	**I in (mm)**	**d2 (N x) in (mm)**
WHD75	20.31 (516)	36.06 (916)	1.97 (50)	8.26 (210)	4 x 0.51 (13)	9.25 (235)	2.99 (76)	11.02 (280)	4 x M6
WH100		44.33 (1126)							
WH150	23.50 (597)	49.84 (1266)							
WH200		61.26 (1556)							
WH300	32.75 (832)	68.31 (1735)	3.50 (89)	13.78 (350)		14.96 (380)	4.92 (125)		8 x M6
WH400		78.15 (1985)							
WH600	39.06 (992)	80.27 (2053)							
WH800		96.57 (2453)							

2-8 Silo Dehumidification System

Airflow range – Mid- Size 50-225 cfm

NOTICE ***In most cases, a 50 cfm dryer may not be adequate.***

Metal silos are affected by the weather conditions surrounding them. They can become damp internally from sweat on their sidewalls caused by changes in humidity and temperature and this moisture can be transferred to the material stored in the silo. Silo dehumidifiers are not intended to dry the material stored inside the silo.

Silo dehumidifiers operate on the simple principle of providing a blanket of dry air in the space above the material to keep the material from picking up additional moisture while in storage. Silo dehumidifiers are usually installed in the base of a silo. One dehumidifier may serve more than one silo (if sized properly depending on the location and climate conditions).

The process heater is usually removed from the desiccant dryer (not required).

The process delivery air is driven to the top of the silo up the bulk material air delivery tube. There is usually an air feeder tap line with a shut off valve (special tube assembly kit) sold with the dryer to be installed in the truck fill line.

Never run the silo dehumidification system when you are filling material with the bulk truck fill line. Isolate the dryer line with shut off valve and turn the dryer off line.

Run a return line back to the dryer to close loop the dryer and complete the loop to the dryer.

This silo dehumidified air blanketing system will blanket the silo with dehumidified air under positive pressure. It will minimize moisture contamination of the resin.

The number of air exchanges and integrity of the blanket will depend on the size of the desiccant system, the blower pressure and silo dome seals.

Review the silo deck for leaks prior to installation and install a PRV dome lid to prevent air from leaking. Make sure the dome lid has pressure relief to allow for excess pressure build up.

Contact our factory application engineers for expert design and installation support.

Chapter 3: Installation

3-1 Positioning Your Dryer

The dehumidifying dryer system was designed to be wheeled and locked into place. The entire assembly is mounted on a rugged, compact frame and is equipped with sturdy, 4" (10 cm) heavy-duty casters. It is important to leave room to access the dryer from the front, rear, and at least one side, for repair and regular maintenance.

Also keep in mind all electrical and mechanical connections that have to be made. If you are using the optional Aftercooler or Precooler, your dryer should be positioned near your plant's water supply lines. If your dryer is used in conjunction with a conveying system, the dryer and all applicable drying hoppers should be placed within a reasonable distance from the other auxiliary equipment.

⚠CAUTION ***Use caution and observe safety rules when placing your dryer! Never move your dryer when the hopper(s) are full of material. Make sure the wheels have been locked after placing your dryer.***

3-2 Checking for Proper Blower Rotation

Three-Phase Models

To check each blower for proper rotation proceed using the following steps:

- ✓ Locate the inlet and outlet ports on the side of the dryer where the hopper is attached to the dryer. Place your hand over each port and verify that the return inlet has a vacuum present and that the outlet has pressure.
- ✓ For the regenerative cycle blower, there should be pressure leaving the exhaust port on top of the dryer and a vacuum present at the inlet of the regen filter.

⚠CAUTION ***In three-phase models, incorrect phasing of power leads can cause backward rotation of blower motors and CONTAMINATION OF THE DESICCANT! Always check blower rotation before putting material in the drying hopper!***

If the three-phase blower rotates improperly, reverse any two wires at the fused disconnect in the control enclosure. This assures that the blower rotates in the proper direction.

Process Blower

The air connection marked “Delivery” should be blowing air while the “Return” connection has suction.

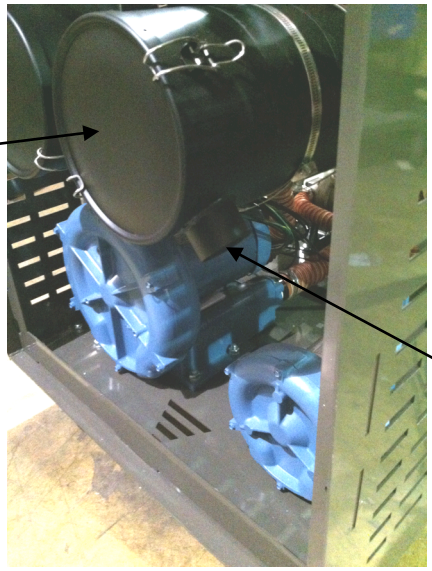
Return Port

Delivery Port

Note: The return port is hosed to the process filter inlet.

Regeneration Blower

Regeneration filter



The regeneration filter inlet shown should be sucking air in for the regeneration cycle.

3-3 Process Air Connections Between the Dryer and Drying Hopper

- ☑ Remove the cap plugs from the inlet, discharge and bleed tubes before operation.
- ☑ Use high-temperature flexible dryer hose to connect the dryer to the drying hopper.
- ☑ Keep the delivery hose as short as possible to minimize heat loss. Insulated dryer hose is available for maximum energy savings.
- ☑ Do not shorten the return hose.
- ☑ Make sure the hoses are not kinked.
- ☑ Drying hopper air inlet and outlet locations vary from one drying hopper model to another, but always connect the hoses so the dry process air from the dryer enters the bottom of the drying hopper and flows out the top to return to the dryer inlet.

3-4 Connecting Cooling Water to the Optional Aftercooler/Precooler

High temperature applications (250°F to 400°F / 121°C to 204°C) require aftercoolers to cool moist air returning to the dryer from the drying hopper. An aftercooler cools the return air by 100°F (38°C); this maintains dryer efficiency and condenses unwanted plasticizers from the air-stream. Heat Exchangers are also required (called pre-coolers) when processing materials that have extremely low drying temperatures (typically 120° F to 180° F / 49° C to 82° C). Check your specific dryer model technical specifications for actual requirements. Some models have a minimum low end temperature range that will determine actual requirements.

Installing Water Lines

- Use the ½" (about 13 mm) brass pipe nipples for water line connections. Inlet and outlet line positions do not matter.
- Make sure you grip the nipple tightly when attaching a fitting. Doing so prevents damage to the soft copper coils. You should make connections with flexible hose to allow removing the coil assembly for cleaning.
- The aftercooler is designed to utilize either tower or city water as warm as 85ºF (29ºC).

  Recommended flow rates:

Water Flow Gallons Per Minute (Liters Per Minute)	MDB Model
2 (7.6)	MDB85
3 (11.4)	MDB170
4(15.1)	MDB255
7(26.5)	MDB380

3-5 Optional Plasticizer Trap

Plasticizer traps should be used when resins are processed in the family of acetates, butyrates and/or propionates. They should also be used when any resin (when dried) is known to produce residue, contaminates or volatiles. This contaminate is trapped in the air stream and is carried back from the drying process as the air leaves the drying hopper.

The plasticizer trap will condense the contaminate that is in the air stream and remove it before it enters the dryer unit. If this contaminant is not removed, it can foul the desiccant beds and damage mechanical components in the dryer and in the drying process

NOTICE Review your process and confirm with your resin supplier if this will be an issue. If it is, a Plasticizer trap must be used or it will void the warranty on the dryer.

3-6 Drying Hopper

Removing the Rust Inhibitor

Rust preventative may have been applied to internal unfinished surfaces. **Remove rust inhibitor *before*** using the drying hopper.

Using a non-water based degreasing agent, clean all inside surfaces of the drying hopper. Allow components to dry **thoroughly**.

Inspect the inside of the drying hopper for loose connections, foreign objects, or a blocked diffuser.

Air Trap Considerations

The air trap assembly in the top of the drying hopper prevents ambient air from contaminating the material being dried.

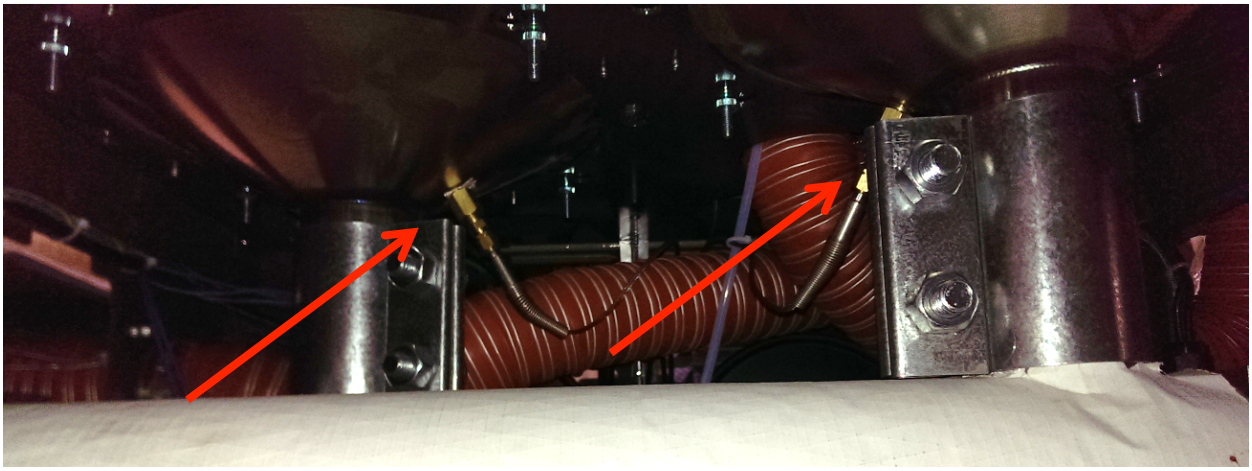
- ☑ Keep the material level at the mid point of the air trap for maximum efficiency.
- ☑ Use a hopper loader or vacuum conveying system to maintain the proper material level.

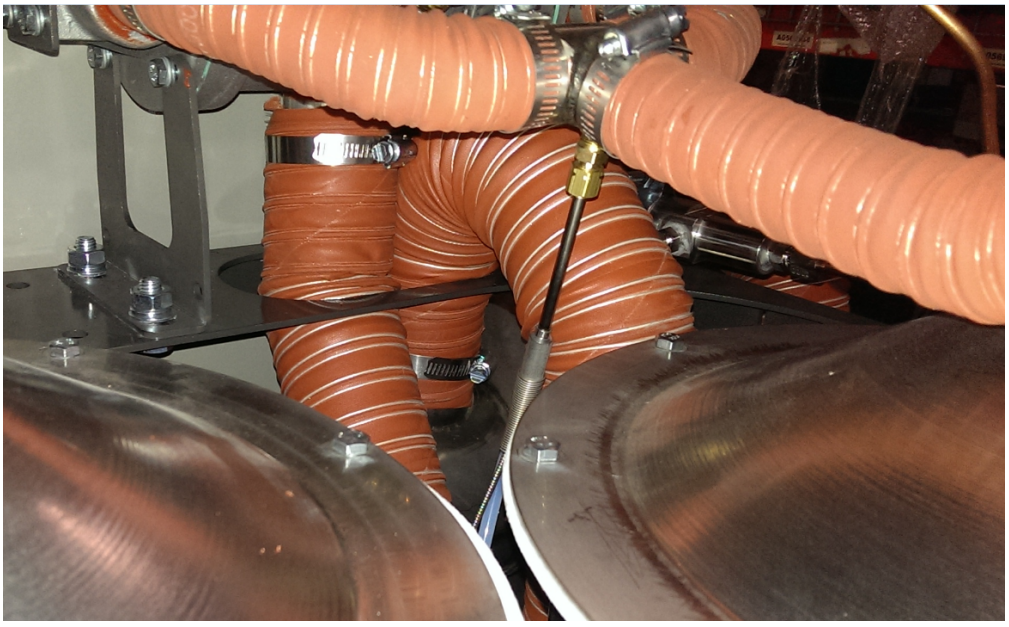
3-7 Thermocouples

In the Dryer

NOTICE

There are 3 thermocouples located inside of the MDB Dryer unit. There is one located underneath each desiccant can, and one located at the exhaust of the upper valve. It is very important that they are properly installed before operation. Failure to do so could cause high temperatures to melt the resin in your drying hopper(s). Thermocouples are connected to the control and help regulate the process and regen temperatures in your system.

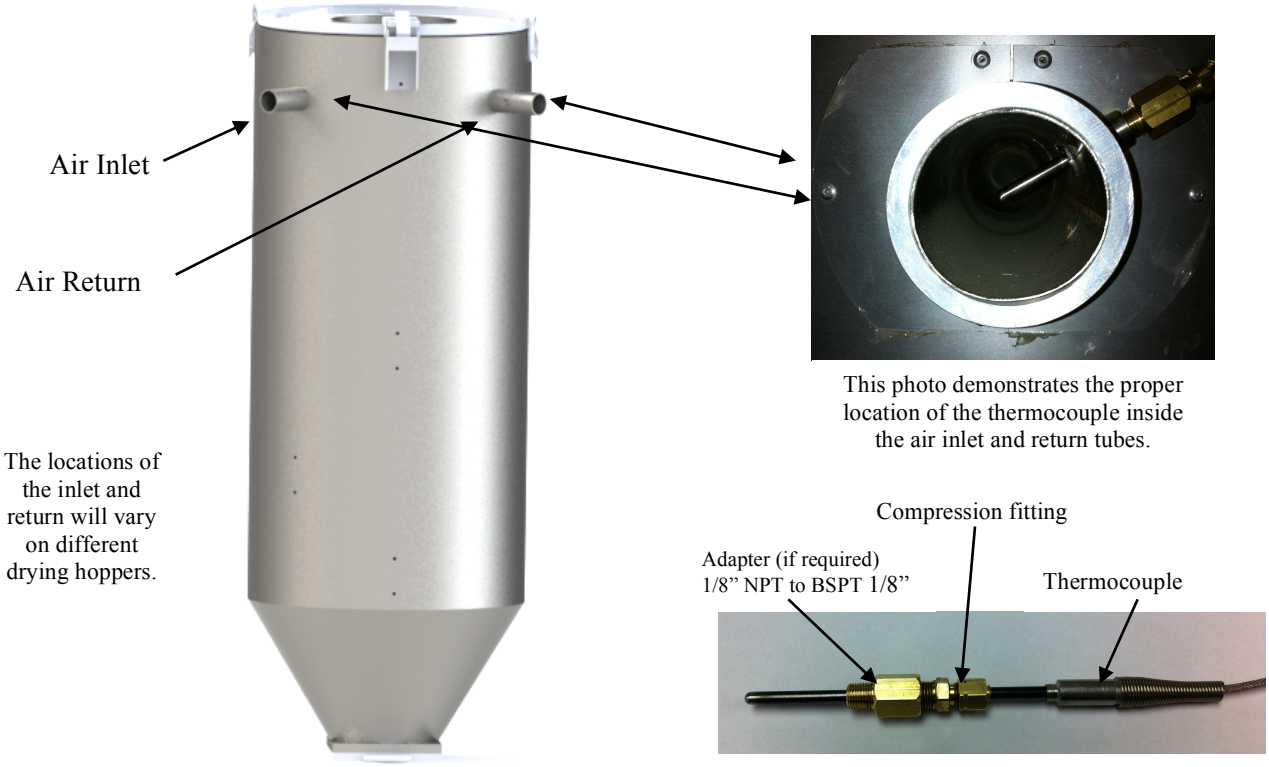




On the Hopper

NOTICE

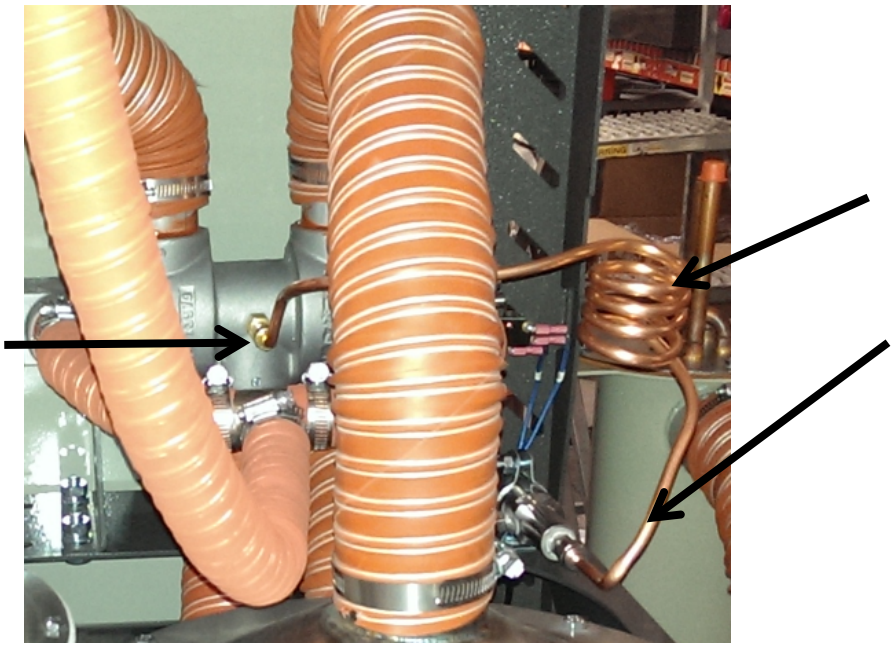
For the dryer to function properly it is critical to place the process air thermocouples on the drying hopper inlet and outlet. These devices accurately monitor the air temperature entering and leaving the drying hopper, the value of which is used by the control to maintain the process temperature set point. Compression fittings are required to hold the thermocouple in place so that the tip is approximately in the center of the tube as shown.


Air Inlet
Air Return
The locations of the inlet and return will vary on different drying hoppers.
This photo demonstrates the proper location of the thermocouple inside the air inlet and return tubes.
Compression fitting
Adapter (if required) 1/8" NPT to BSPT 1/8"
Thermocouple

WH Series Drying Hoppers

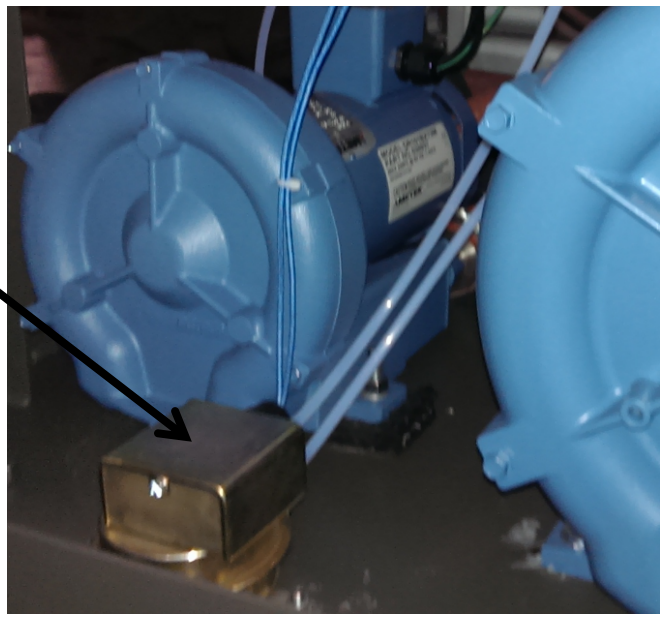
3-8 Dewpoint Sensor

The Dewpoint Sensor is a vital part of the dryer because it helps maintain the required dewpoint for your application. It is easy to locate in your dryer because it is equipped with copper tubing. Depending on the dryer model, the copper tubing may go directly to the upper valve, or plastic tubing may be required to complete the connection. The other end of the sensor should be attached to the vacuum inlet of the process blower. The airflow schematic located earlier in this manual will show these connections.



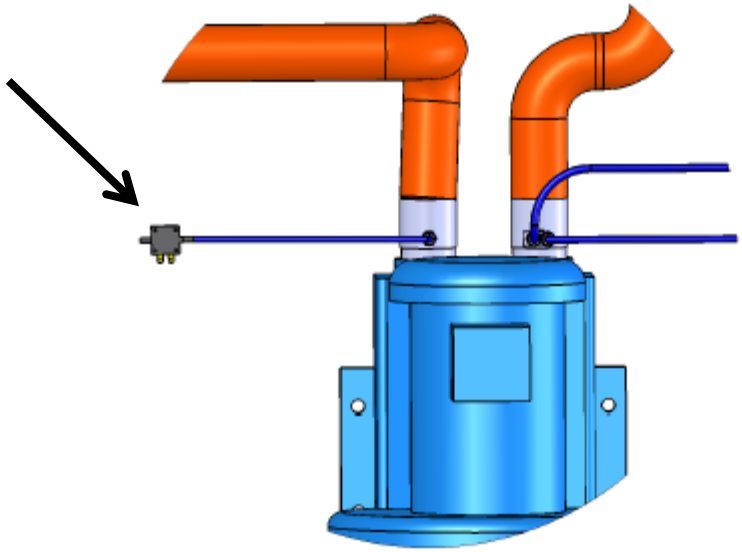
3-9 Dirty Filter Pressure Switch

Check for the proper tubing between the pressure switch and the process blower and filter. If you use the configuration of the switch as shown to the right as a reference, the upper tubing should run to the other fitting on the process blower vacuum inlet. The tubing on the bottom should run to the fitting just above the process filter inlet. Refer to the airflow schematic for a detailed look.

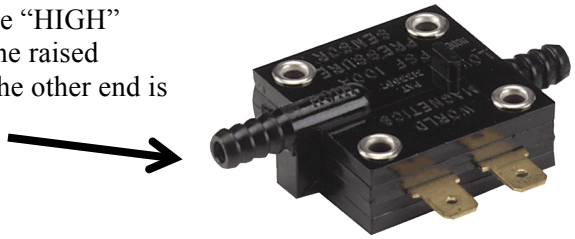


3-10 Blower Pressure Switches

The MDB Dryers contain a pressure switch connected via tubing to each blower outlet. It is important that the tubing (colored blue in the drawing) is attached to the correct end of the switch. The other end should be open to the atmosphere.



This is an enlarged view of the pressure switch. The tubing should be connected to the "HIGH" pressure end, which is the end with the raised connection as the arrow indicates. The other end is left open to the atmosphere.



Chapter 4: Operation

4-1 Pre-Startup Checks

1. Verify that the drying hopper is clean of rust-prohibitive oil or any foreign objects.
2. Verify that process and return hose connections are tight.

NOTICE

3. Make sure that the thermocouples are attached at the inlet and outlet of each hopper in your system. Failure to do so may cause damage to your drying system.
4. If your dryer has a water-cooled Aftercooler or Precooler make sure that sufficient cooling water flows properly through the coil and that you have bled any trapped air from the system. Make sure that the Aftercooler and Precooler has the proper supply water temperature.
5. Check all companion equipment, such as the sight glass loader and drying hopper loader; verify that all convey tubing is in place and the loading system is ready for operation.
6. Verify that all electrical connections are **tight** and the unit is properly grounded.
7. With main power on, turn the dryer on until the process blower starts, verify blower rotation. (see section 3-3)

⚠CAUTION ***Clean the rust-preventing oil from inside the drying hopper. Failure to clean the hopper fouls the desiccant and voids your warranty!***

Chapter 5: Maintenance

5-1 Work Rules

The installation, operation, and maintenance of this equipment is to be conducted in accordance with all applicable work and safety codes for the installation location. This may include, but is not limited to, OSHA, NEC, CSA, and any other local, national, and international regulations.

In addition, you must observe the following specific work rules:

- ☑ Keep these operating instructions on hand and follow them when installing, operating, or maintaining your dryer.
- ☑ If these instructions become damaged or unreadable, you can obtain additional copies from the manufacturer.
- ☑ Only qualified personnel familiar with this equipment should work on or with this unit.
- ☑ Work only with approved tools and devices.

Disconnect power before servicing your dryer. If the disconnect switch you installed has a lockout, lock it in the **OFF** position before you perform any maintenance or service.

5-2 Servicing Air Filters

⚠CAUTION

Operating the dryer without the process air filter installed voids your warranty! Filter cleaning is an important part of your dryer maintenance program.

Our dehumidifying dryers have a single cartridge canister-type filter in the process and regen air loop. Refer to the individual model schematics in the General Information section, to locate your machine's filters. These filters protect the blowers from plastic fines drawn in from the drying hopper. Regular filter cleaning is essential to keep your dryer operating at peak efficiency.

You can wash or blow out the filters, but remember, you reduce dirt holding capacity with each washing. The risk of dirt reaching the clean side of the filter during cleaning, plus possible filter damage from high pressure washing or blowing, makes washing a gamble.

You can carefully clean or wash the filter when airflow becomes restricted. Do **not** wash filters more than six (6) times or use them for more than a year, whichever comes first.

Use a detergent that won't damage filter media. Such a detergent permits easy removal of dirt particles through flushing and rinsing. An effective detergent removes the fine particles from the pores of the filter media.

The filter manufacturer recommends FM 1400 washing compound. It is formulated specifically for air filter element cleaning. It is non-sudsing and works in hot or cold water. FM 1400 contains biodegradable synthetic detergents and is non-phosphate, non-NTA. For more information, contact Filter Service Corporation, 2603 A West Main, Farmington, NM, 1-505-326-1127.

Recommendations for Cleaning and Replacing Filters

- Turn off and/or lock out electrical power to the dryer.
- Remove the threaded fastener securing the filter access cover, and then remove the cover.
- Remove the nut on the center retaining rod to remove the filter cartridge.

Vacuuming

Try vacuum-cleaning a soiled filter first. Vacuuming removes most large particles and surface contaminants, and may suffice for the first time you clean a filter. Use a commercial-duty (recommended) or household vacuum cleaner. Vacuum the filter from the air intake (dirty) side only.

Cleaning with Compressed Air

Blow clean, dry compressed air up and down the pleats, blowing out the filter from the clean side. Remove loose dirt from the filter with compressed air or a water hose. Compressed air should be less than 100 psi (689.5 kPa/6.89 bars). Use a $^{1}/_{8}$”
(3 mm) dia. nozzle at least 2” (5 cm) away from the filter. Don’t shoot the air in a crisscross motion against the grain of the pleats—you may damage it.

Washing

As a last resort, wash the filter. However, do so only if the pressure drop is too high from fine dirt embedded in the filter, or if oily mist is present near the intake air location. Soak in a solution of FM 1400 or comparable detergent and warm water for five to ten minutes, then gently agitate for several minutes.

Rinse thoroughly with clean water to remove all detergent.

⚠CAUTION ***Let the filter dry completely before returning it to service! A damp filter can contaminate the closed loop system of the dryer.***

Do not use a light bulb to dry the filter. You should get satisfactory filtration after second or third washings; however, dirt-holding capacity of the filter **decreases** after each washing.

After each cleaning:

- Inspect the filter element. Briefly hold a light bulb behind the element and look for any fatigued paper or residual dirt. Inspect for holes and tears by looking though the filter toward a bright light. Check for damaged gaskets or dented metal parts. Do not re-use a damaged filter!
- Inspect the end plates. Any damage here can allow air to bypass the filter.
- Look for rust on the end plates and metal core. Rust particles can flake off and contaminate the dryer and resin.
- Check the gasket for damage. A damaged gasket allows contaminants into the process. Replace as needed.

- Allow the filter to dry before re-using. Circulate warm air at less than 160ºF (71ºC). Do not use a light bulb to dry the filter

5-3 Preventative Maintenance Checklist

Dehumidifying Dryer Systems

System model #						Serial #							
Every week	**Date/ By**	**Date/ By**	**Date/ By**	**Date/ By**	**Date/ By**	**Date/ By**	**Date/ By**	**Date/ By**	**Date/ By**	**Date/ By**	**Date/ By**	**Date/ By**	**Date/ By**
Inspect all filters for wear, replace/clean if dirty or worn.													

Every month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Lock out electrical power and inspect electrical wiring for integrity.												
Lock out electrical power and check heater elements for continuity using an ohmmeter.												
Check dew point and temperature tracking with an external dew point monitor and pyrometer.												
Visually inspect the shifting of the airflow valve during one cycle.												

Every year	Next scheduled inspection	Actual inspection Date/By	Next scheduled inspection	Actual inspection Date/By
Inspect desiccant. Replace if brown or broken.				

Every two years	Scheduled replacement date	Actual replacement Date/Work done by	Scheduled replacement date	Actual replacement Date/Work done by
Replace desiccant.				

- ***Photocopy this page for your maintenance records –***

5-4 Servicing the Dew Point Monitor

The accuracy of the dew point monitor on dehumidifying dryer systems depends on proper operation of the dew point sensor and the control board. The dew point sensor is in the process air stream and is therefore susceptible to contamination.

Dew point sensor life depends on:

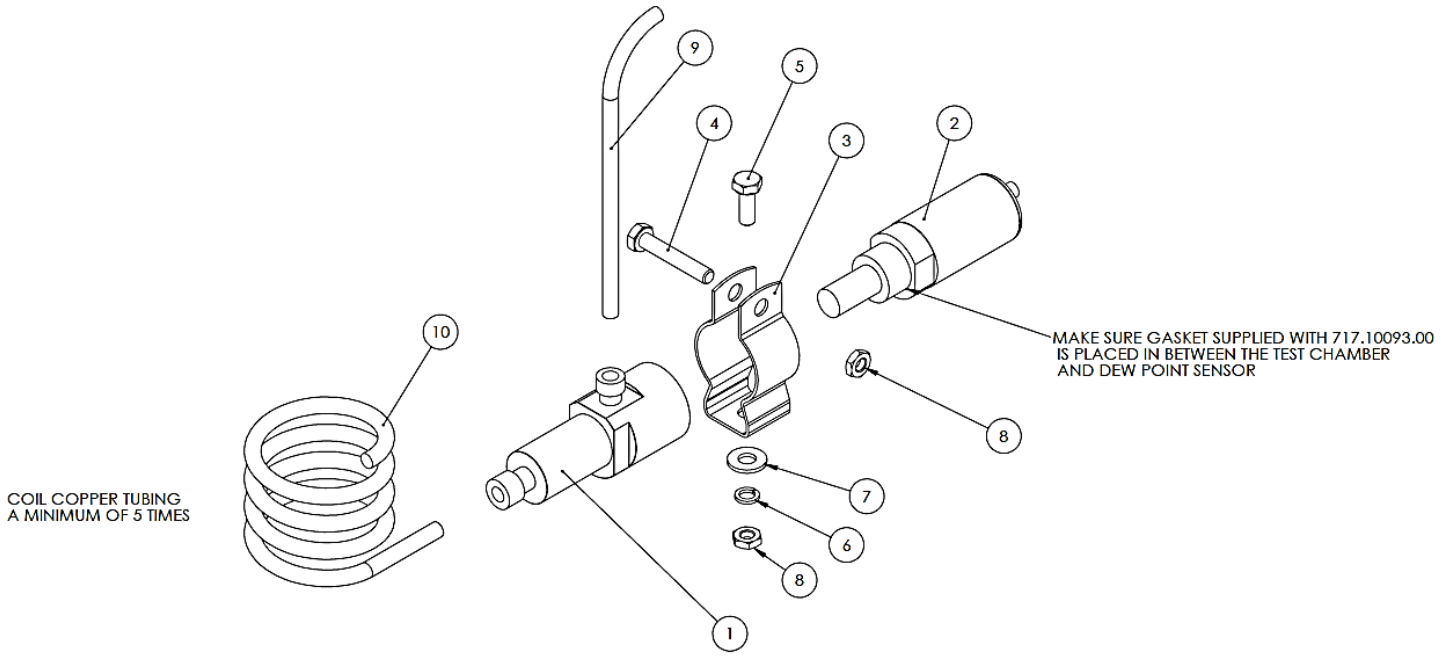
Air temperature and flow passing over the sensor.

The amount of fines (dust) in the process air.

The amount of plasticizer vapor in the process air.

The dryer operator should monitor the initial dew point sensor readings and establish a periodic replacement schedule as needed.

⚠CAUTION ***Do not attempt to check the continuity or resistance of the dew point sensor. The sensor will be destroyed!***



1. Sensor Test Chamber #717.10094.00
2. Dewpoint Sensor #717.10093.00
3. Clamp #A0069007
4. M6x1.0x35 HCS
5. M6x1.0x16 HCS
6. M6 Lock Washer
7. M6 Flat Washer

8. M6x1 Hex Jam Nut
9. 6mm Hi-Temp Tubing #207.00132.00
10. Copper Tubing #A0006071

Dewpoint Monitor Troubleshooting

If the DryPro Control is displaying erratic Dewpoint values, you will want to check that your Dewpoint sensor is operating properly. Keep in mind that it may take up to 6 minutes for the sensor to start operating normally after startup, due to automatic calibrations within the sensor. If you still suspect that there are errors in the Dewpoint readings, follow the below guidelines for possible solutions.

1. Check the Alarm LED on the Sensor:

   Not lit: Power off or LED functionality disabled

   Green: Power on, normal measurement.

   Green and blinking: Purge or Autocalibration in progress

   Red: Dewpoint above limit

   Red and blinking: Transmitter error
2. For Transmitter error try disconnecting and reconnecting the power to the Dewpoint sensor to see if the problem persists
3. Check the surrounding tubing for leaks as this could add ambient air to the airstream and throw off the Dewpoint readings.

If the problem persists, contact ACS right away for assistance. Avoid changing any parameters or settings of your sensor until you have talked with a qualified ACS Service Technician. You will find phone numbers at the end of this manual in the Appendix chapter.

5-5 Symptoms of Worn Desiccant

The moisture absorption capacity of the desiccant used in your dehumidifying dryer degrades after an indefinite period of time. Useful life depends on variables such as material moisture content, plasticizer vapors in the return air, and number of regeneration cycles.

Your dehumidifying dryer may need new desiccant if it exhibits any of the following symptoms:

- Plastic material is not being dried sufficiently (high scrap/reject rate).
- Air temperature at the top of the regenerating desiccant bed rapidly climbs to 350°F (177ºC) or more shortly after the start of regeneration, even though a saturated bed has just started heating.
- The process air dew point measured with a portable dew point monitor is higher than -10°F (-23ºC) throughout the process drying cycle.
- Smoke or dust blows out of the process air outlet.
- Noticeable amounts of desiccant in the beds is a medium-brown color or darker.

If you notice any of these signs, replace the desiccant in the desiccant beds. Desiccant replacement kits are available from the manufacturer's parts department. If you want, a service technician can repack desiccant beds at your site.

Desiccant material causes eye irritation! Breathing in desiccant dust may be harmful and may cause skin irritation!

- ***Do not get in eyes.***
- ***Avoid prolonged contact with skin.***
- ***Use with adequate ventilation.***
- ***Wash thoroughly after handling.***

First Aid:

In case of eye contact, immediately flush eyes with plenty of water for at least 15 minutes. If irritation persists, see a physician.

5-6 Replacing Worn Desiccant

⚠CAUTION ***Make sure desiccant beds are sufficiently cool before replacing worn desiccant.***

1. Disconnect the electrical supply.
2. Remove the rear panels to expose the desiccant beds.
3. Access the desiccant cans in one of the following ways:

   Remove the entire bed from the frame.

   - Remove the hoses located at the top of the beds.
   - Remove the thermocouple and fittings. Make a note of the correct location for each.
   - Loosen the knurled nuts below the desiccant can.
   - Loosen the couplers below the desiccant can.
   - Ttwist the desiccant can clockwise and lift to remove.

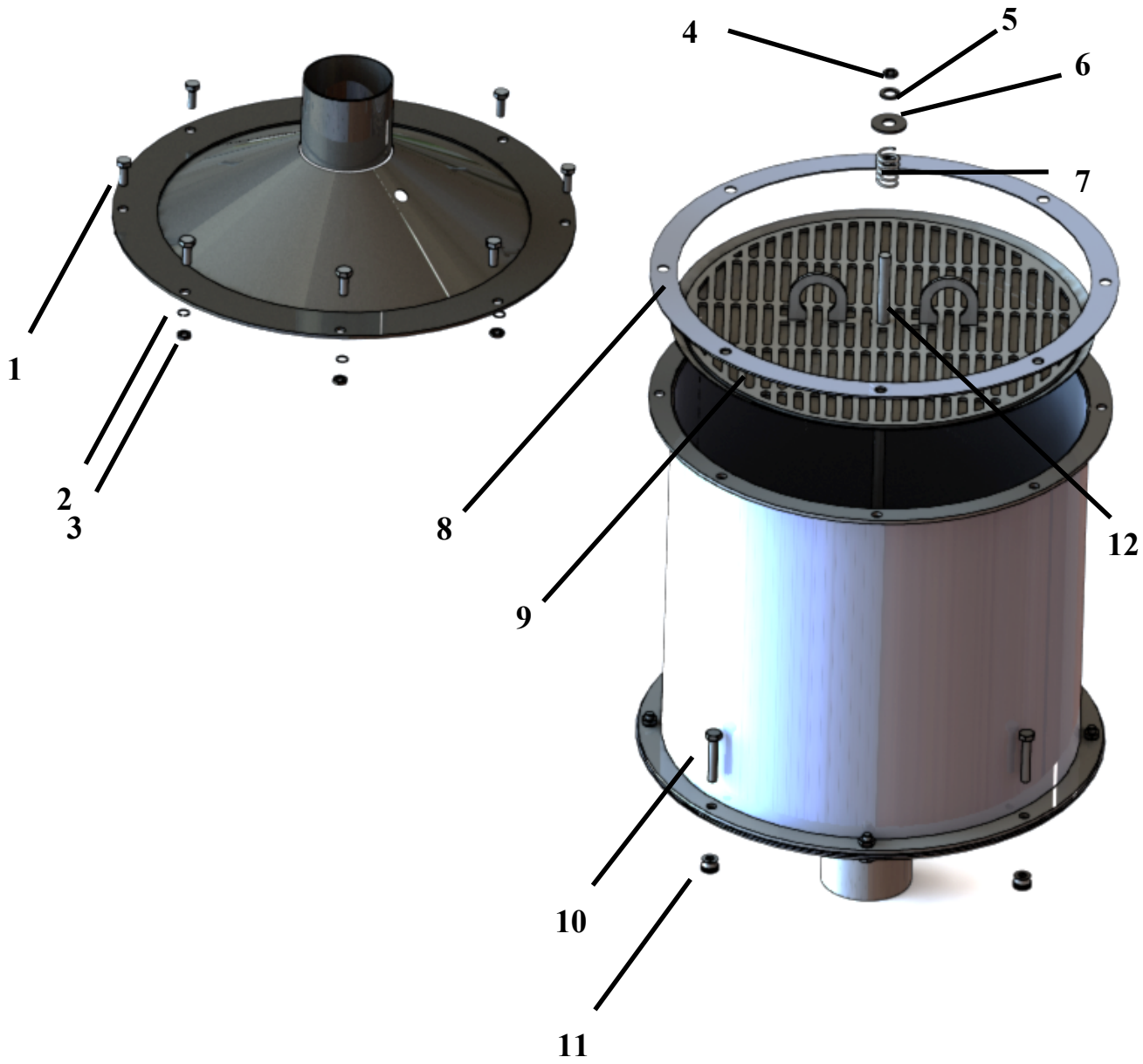
   Remove only the top cover then remove the screen inside by removing the single nut at the center of the can.
4. Replace the desiccant in one of the following ways:

   - **Replace the entire desiccant can** with a pre-packed desiccant can assembly available from parts and service. Contact ACS for a new can assembly. Drop in the new cans, tighten the knurled nuts, and replace the thermocouple and fittings.
   - **Vacuum out the desiccant** from the can and proceed to step 5.

Make sure the bed interiors are clean.

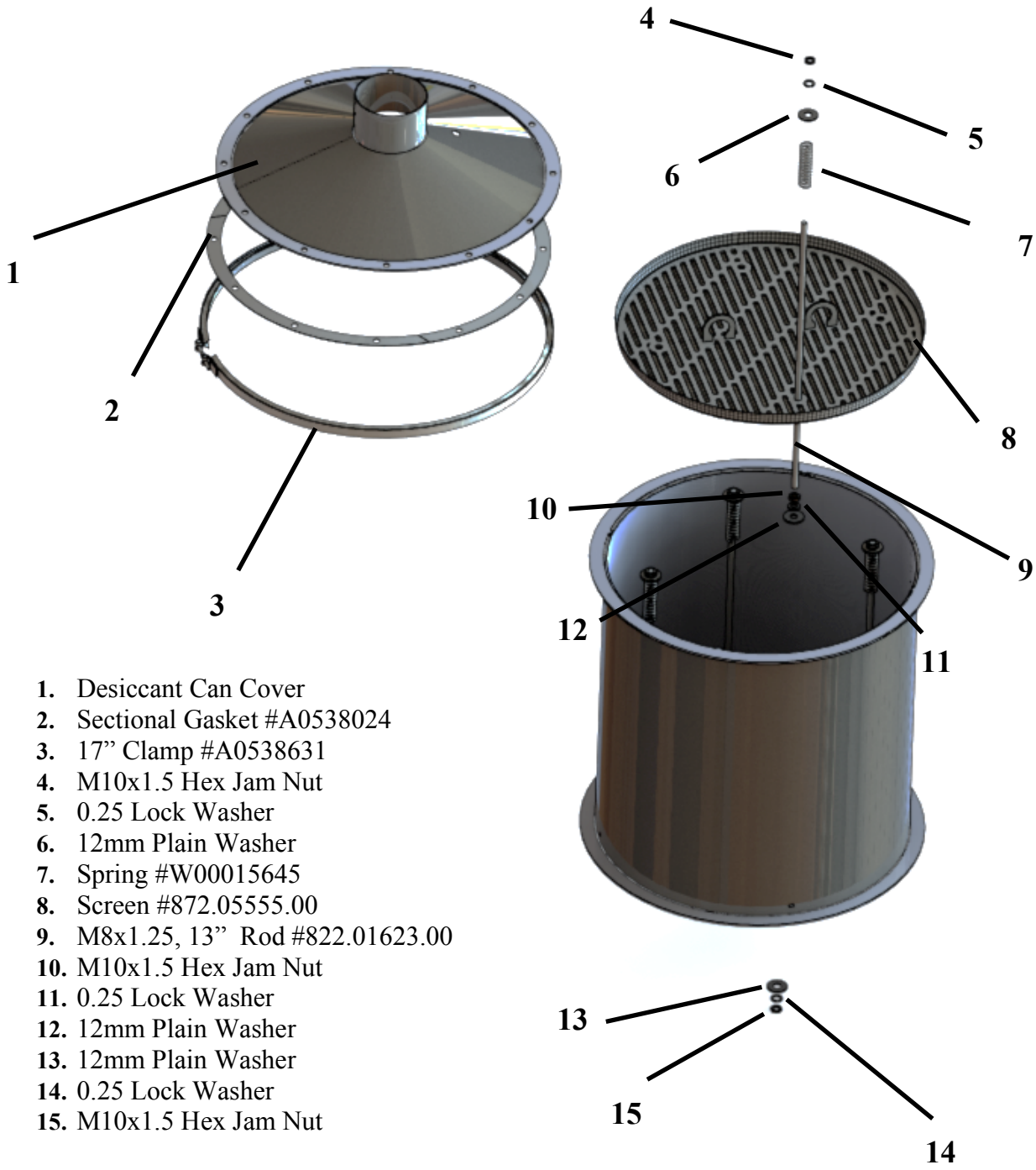
⚠CAUTION ***You should properly dispose of any discarded desiccant. Consult local disposal regulations for more information.***

MDB85 & MDB170 Desiccant Can Assembly



1. Hex Cap Screw M6x1.0x16
2. M6 Lock Washer
3. M6x1 Hex Jam Nut
4. M6x1 Hex Jam Nut
5. M6 Lock Washer
6. 8 mm Plain Washer
7. Spring #W00018643
8. 11-1/2" Gasket #A0534086
9. Screen #872.03296.00
10. Hex cap Screw M6x1.0x35
11. Thumb nut, M6x1.0
12. Rod #822.01623.00

MDB255 & MDB380 Desiccant Can Assembly



1. Desiccant Can Cover
2. Sectional Gasket #A0538024
3. 17” Clamp #A0538631
4. M10x1.5 Hex Jam Nut
5. 0.25 Lock Washer
6. 12mm Plain Washer
7. Spring #W00015645
8. Screen #872.05555.00
9. M8x1.25, 13” Rod #822.01623.00
10. M10x1.5 Hex Jam Nut
11. 0.25 Lock Washer
12. 12mm Plain Washer
13. 12mm Plain Washer
14. 0.25 Lock Washer
15. M10x1.5 Hex Jam Nut

Before re-packing the beds, determine the proper amount of desiccant for the dryer being serviced. Desiccant can assemblies pre-packed from the manufacturer are available and simply drop into the frame. Pre-measured desiccant kits are also available from the manufacturer.

5. Carefully place half of the large bead in the bottom of the beds, in an even layer, on the bottom screen. Place the small bead on top of it, in an even layer. Carefully place an even layer of the remaining large beads over the small beads.
6. Install the top screen, making sure that the edge is in contact with the sides of the bed all the way around. Install the washers and nuts and tighten down. Gently tap around the sides of the desiccant canister with a rubber mallet to settle the desiccant. As settling occurs, re-tighten the nuts. Repeat the tapping and tightening process until little additional settling occurs.
7. Install the covers and gaskets on the beds, making sure they are tight and sealed. Replace desiccant bed gasket if necessary.
8. Re-connect any hoses that were disconnected.

Type 13X Desiccant

Dryer CFM	Large bead (Type 13X)			Small bead (Type 13X)			Total per bed	
	Part no.	lbs.	Kg	Part no.	lbs.	Kg	lbs.	Kg
50	W00018050	1.5	0.68	W00018051	10.5	4.75	12	5.44
100		3.0	1.362		21.0	9.534	24.0	10.896
150		9.0	4.086		30.0	13.620	39.0	17.706
225		9.0	4.086		30.0	13.620	39.0	17.706

5-7 Replacing the Process Heater

Our dehumidifying dryers use Calrod-type heater elements mounted in a heater tube located in the top rear of the cabinet. The wattage of the heater varies with model, voltage, temperature range, etc., but the replacement procedure is the same.

⚠WARNING

Disconnect and lock out power before you replace heater elements!

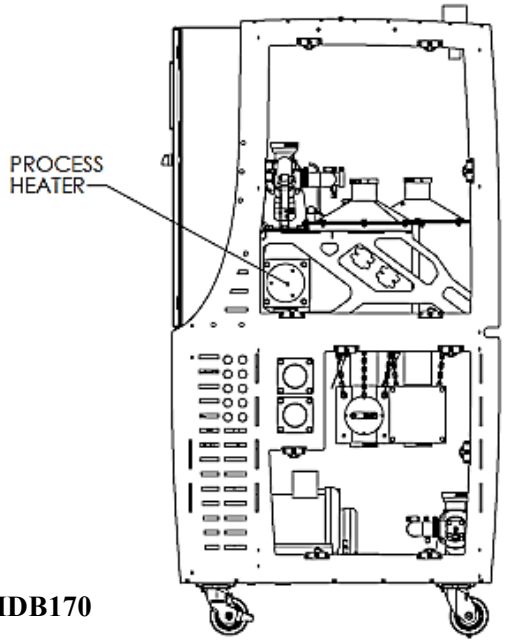
Use the following procedure to replace the process heater:

1. Remove the bolts securing the process heater access cover.
2. Sketch the heater wiring configuration so you can properly re-wire the heater.
3. Remove the wires to the heater plate assembly being removed or replaced.
4. Remove the bolts securing the heater plate assembly, and slide out the assembly.
5. Remove the heater from the mounting plate by removing the large brass nuts and washers.
6. Re-install the heater and heater plate assemblies in reverse order. Install new heater gaskets and securely tighten all fasteners.

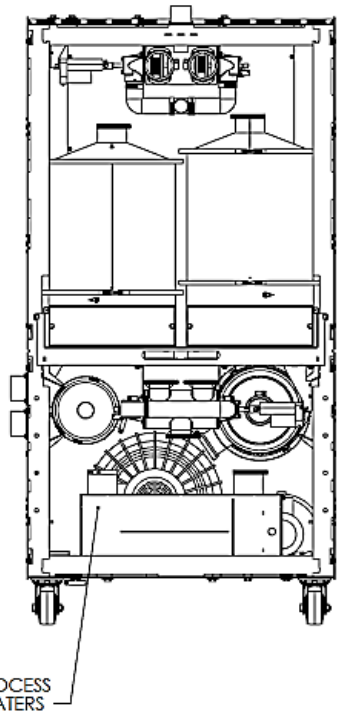
⚠CAUTION

Heater loops should not touch each other. "Hot Spots" lead to premature heater failure!

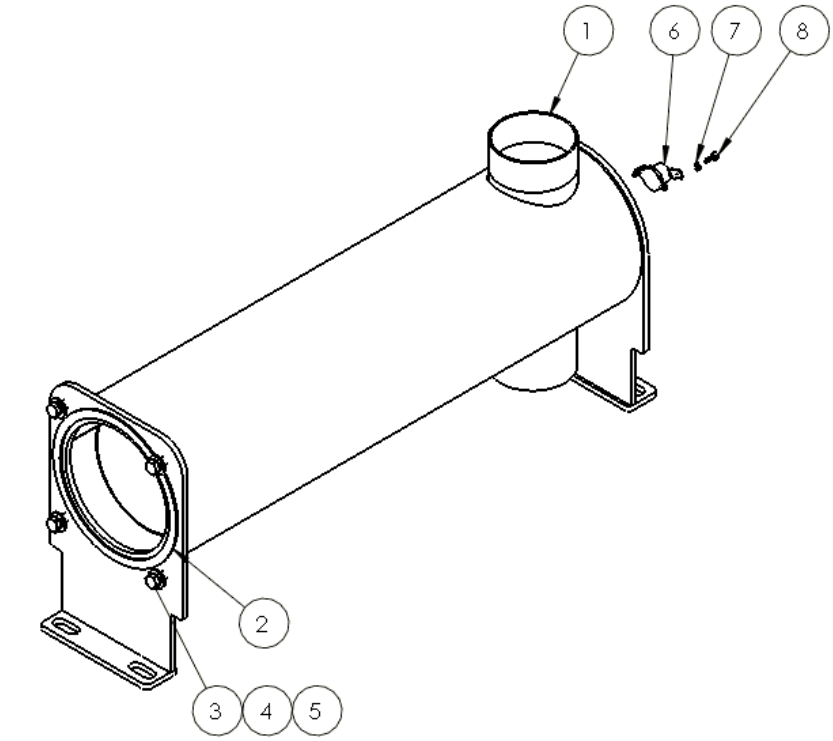
7. Reinstall the wires based on the sketch you made earlier.
8. Secure the heater access cover.



MDB85 & MDB170



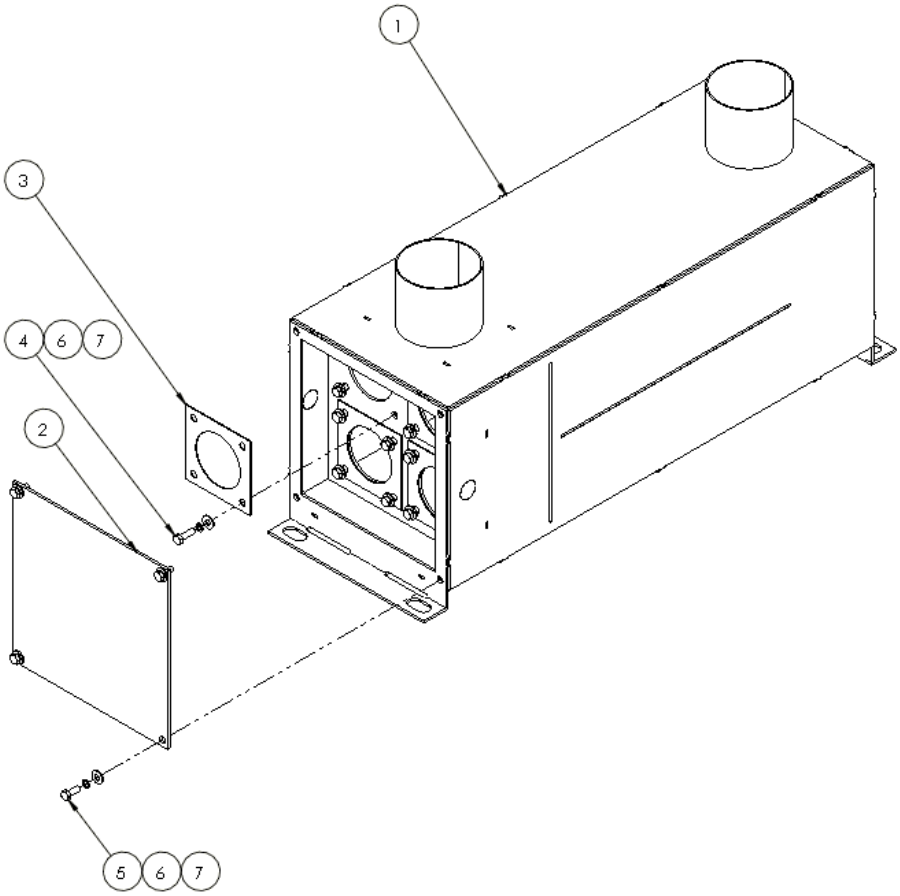
MDB255 & MDB380



MDB85 & MDB170 Process Heater

1. Process Heater Manifold
2. Heater Gasket #A0534251
3. Hex Cap Screw M6x1.0x16
4. M6 Lock Washer
5. M6 Flat Washer
6. High Temp Disconnect Switch #A0566676
7. M3 Lock Washer
8. Socket Head Cap Screw M3x0.5x8, G12

Hardware is in Metric Units, Unless Specified



MDB255 & MDB380 Process Heater

1. Process Heater Manifold
2. Heater Box Cover
3. Heater Gasket #W00012917
4. Hex Cap Screw M6x1.0x20
5. Hex Cap Screw M6x1.0x16
6. M6 Lock Washer
7. M6 Flat Washer

Hardware is in Metric Units, Unless Specified

5-8 Replacing the Regeneration Heater

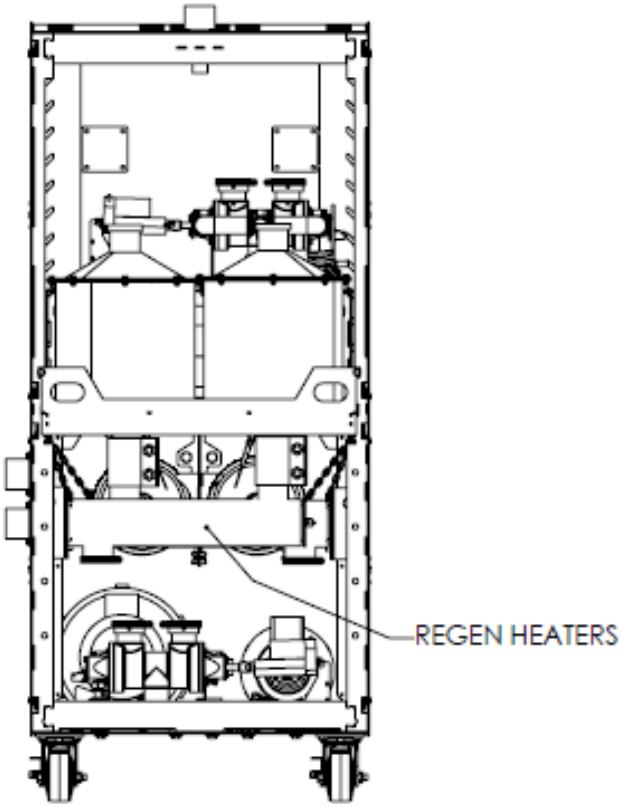
The dehumidifying dryers use heater elements located below each desiccant bed.

⚠WARNING ***Disconnect and lock out power before you replace heater elements!***

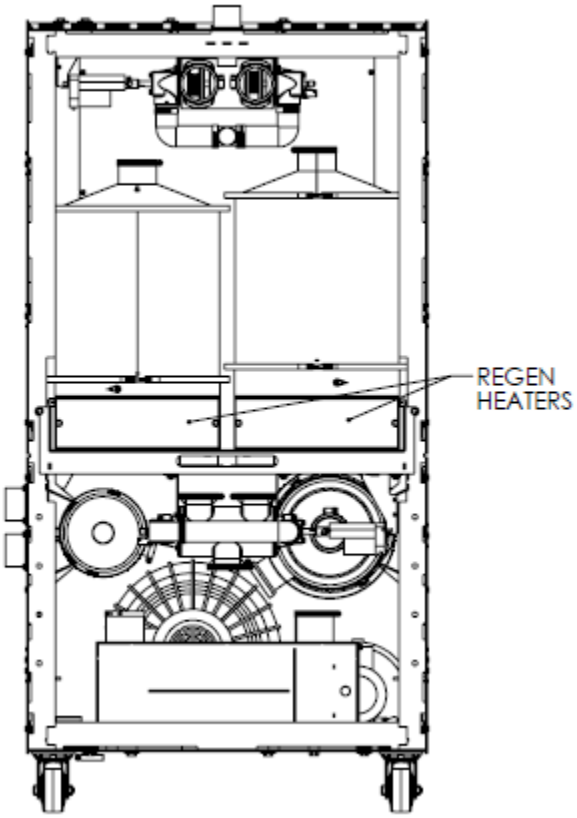
1. Remove the cover plate secured by bolts.
2. Sketch the heater wiring configuration so you can properly re-assemble the heaters.
3. Remove the wiring for the heater being removed or replaced.
4. Remove the bolts securing each heater mounting plate. Slide out the heater.
5. Re-install the new heaters in reverse order. Install new heater gaskets and securely tighten all fasteners.

⚠CAUTION ***Heater loops should not touch each other. "Hot Spots" lead to premature heater failure!***

6. Re-install the wiring based on the sketch you made earlier.
7. Secure the heater access cover.



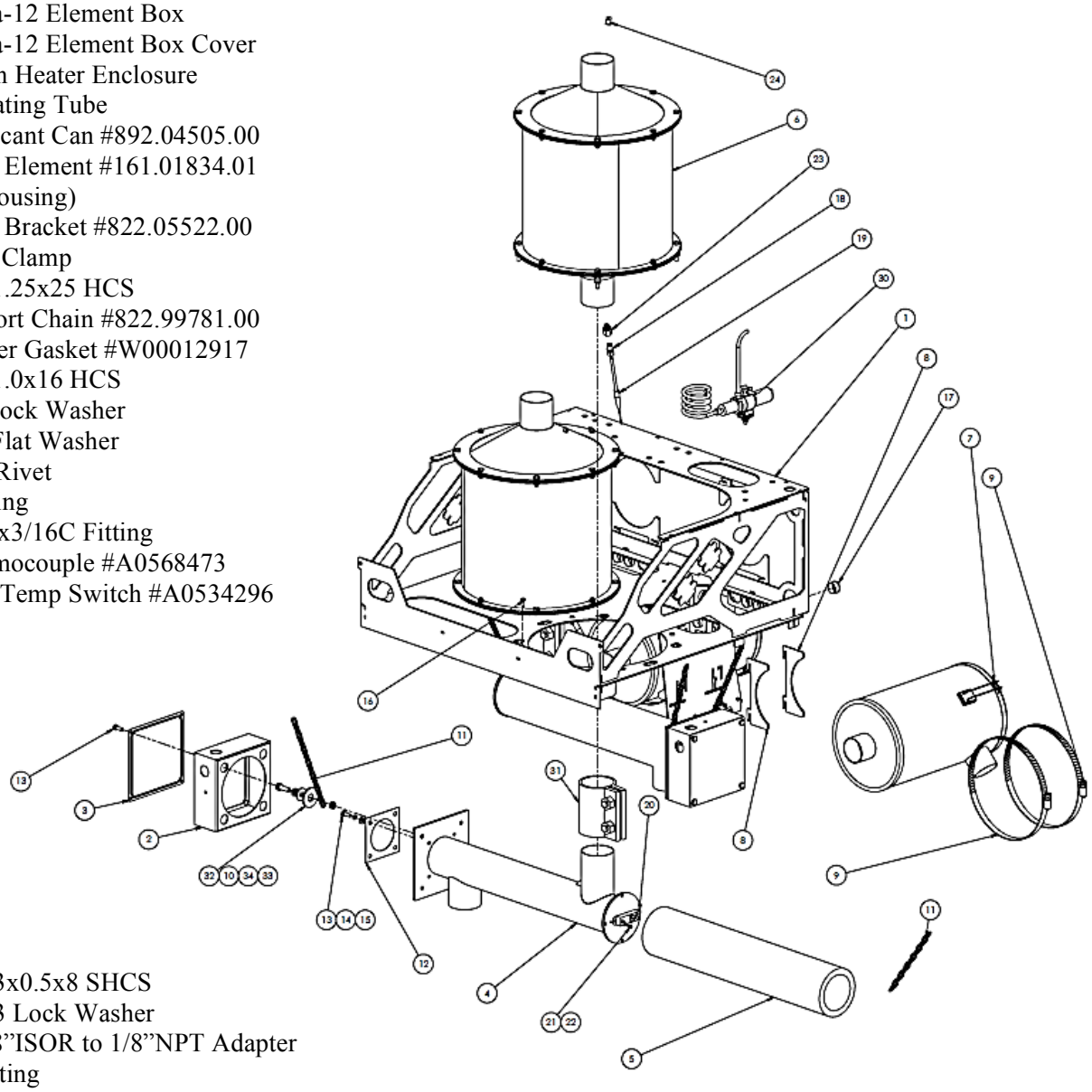
MDB85 & MDB170



MDB255 & MDB380

MDB85 & MDB170 Regen Heater and Tray Assembly

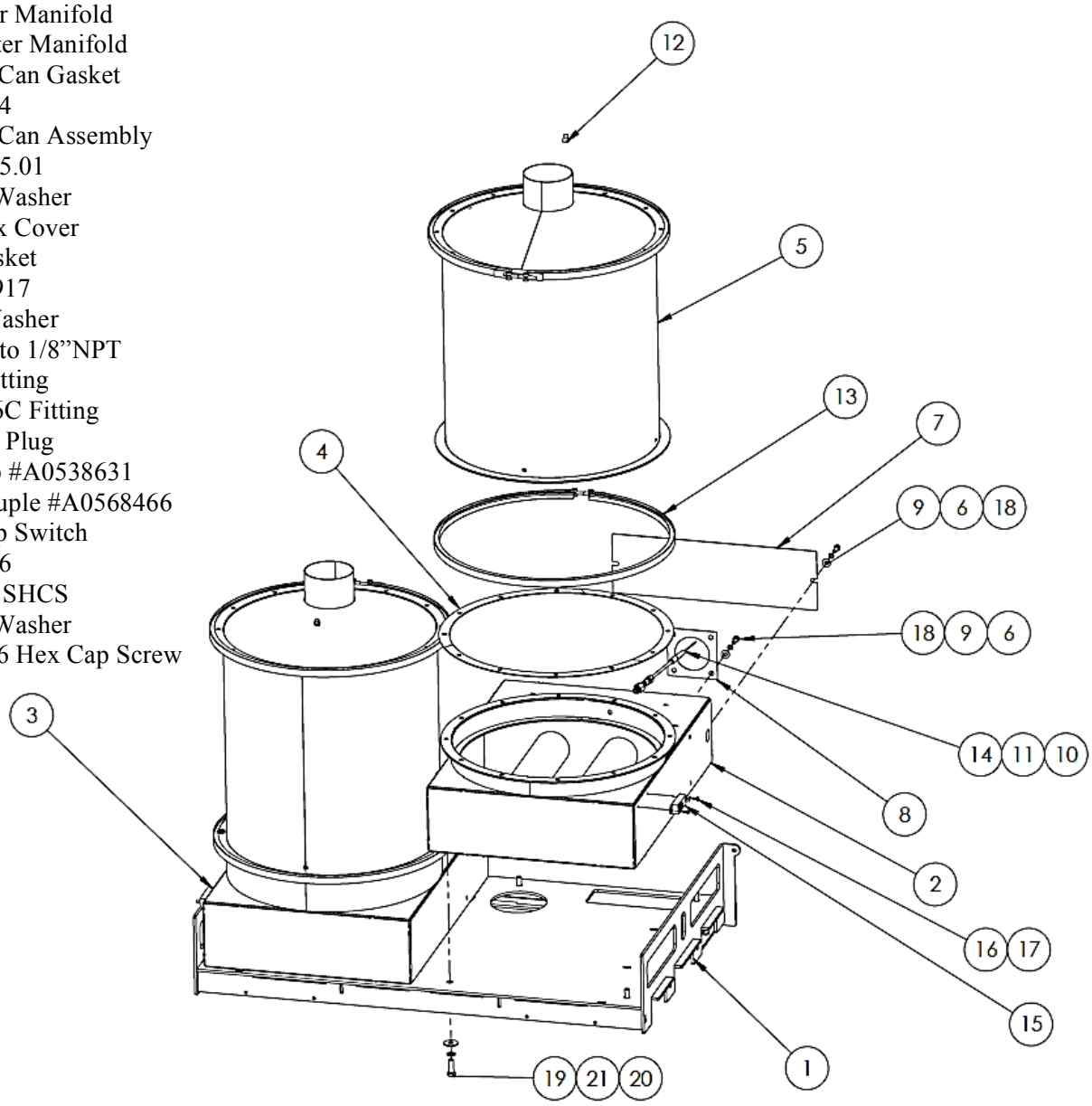
1. Tray Weldment
2. Nema-12 Element Box
3. Nema-12 Element Box Cover
4. Regen Heater Enclosure
5. Insulating Tube
6. Desiccant Can #892.04505.00
7. Filter Element #161.01834.01 (In Housing)
8. Filter Bracket #822.05522.00
9. Hose Clamp
10. M8x1.25x25 HCS
11. Support Chain #822.99781.00
12. Heater Gasket #W00012917
13. M6x1.0x16 HCS
14. M6 Lock Washer
15. M6 Flat Washer
16. 3/16 Rivet
17. Bushing
18. 1/8Mx3/16C Fitting
19. Thermocouple #A0568473
20. High Temp Switch #A0534296



21. M3x0.5x8 SHCS
22. M3 Lock Washer
23. 1/8”ISOR to 1/8”NPT Adapter Fitting
24. 1/8” ISOR plug
25. Pressure Switch #733.00077.00
26. M2.5 Flat Washer
27. M2.5 Lock Washer
28. M2.5x0.45 Nut
29. M2.5x0.45 x 20mm SHC
30. Dewpoint Sensor Assembly #892.20047.00
31. 2 Bolt, 2.50T Coupler
32. 14mm Plain Washer
33. 8mm Plain Washer
34. 0.3125 Lock Washer
35. M8x1.25 Hex Jam Nut

MDB255 & MDB380 Regen Heater and Tray Assembly

1. Tray Weldment
2. Left Heater Manifold
3. Right Heater Manifold
4. Desiccant Can Gasket #A0538024
5. Desiccant Can Assembly #892.04505.01
6. M6 Lock Washer
7. Heater Box Cover
8. Heater Gasket #W00012917
9. M6 Flat Washer
10. 1/8”ISOR to 1/8”NPT Adapter Fitting
11. 1/8Mx3/16C Fitting
12. ISOR 1/8” Plug
13. 17” Clamp #A0538631
14. Thermocouple #A0568466
15. High Temp Switch #A0534296
16. M3x0.5x8 SHCS
17. M3 Lock Washer
18. M6x1.0x16 Hex Cap Screw



19. M8x1.25x25 Hex Cap Screw
20. 8mm Plain Washer
21. 0.3125 Lock washer

Chapter 6: Troubleshooting

Problem	*Possible cause*	Corrective action
Little or no air coming from the process delivery tube.	Dirty filter.	Clean or replace filter.
	Desiccant beds are contaminated by material or plasticizer leaking into the system.	Replace desiccant.
	Blower overload has tripped.	Repair the condition and reset the overload.
	Blower fins filled with dust or contaminants.	Remove blower side plate, clean baffles, replace.
Suction in delivery tube, pressure from the return tube.	Phase is reversed on power drop coming into the dryer.	**Stop the dryer.** If the dryer was connected to the drying hopper, check to see if the desiccant and process air heater has been contaminated with resin. If so, replace the desiccant and remove any resin carry-over. Otherwise, change the phase of two legs of the three-phase power drop.
Loss or reduction of process air temperature.	Process heaters are faulty.	Check for open heaters. Replace if required.
	Solid-state Relay faulty.	Replace Solid State Relay.
	Process temperature was improperly adjusted.	Review Product for proper setting. Train plant personnel about proper temperature set point and operation.
Loss or reduction in drying capacity.	Process heaters are faulty.	Replace.
	Desiccant beds are contaminated.	Replace desiccant.
	Material being dried differs from material specified at the time of purchase.	Drying systems are designed for the material which was originally specified. Different materials may need a longer residence time or different drying temperature.
	Break in flex hose to/from drying hopper.	Inspect for air leaks; replace if necessary.

Problem	Possible cause	Corrective action
Loss or reduction in drying capacity. (Cont'd.)	Airflow valve sticking or failing to shift.	Check for proper operation of valve actuators. Repair or replace if necessary.
	Blower fins filled with dust or contaminants.	Remove blower side plate, clean baffles, replace. Replace filter elements.
PLC Regeneration Bed LED indicators both off.	Insufficient power to PLC (Power LED is off).	Check power supply and power wiring to PLC.
	Faulty PLC (PLC Power light is on, Run light is off, and/or Error light is on).	Replace PLC.
PLC Regeneration Heater Left/Right output indicators both off.	Regenerating bed cool down.	None.
	Blower Input indicator is off.	Verify that blower contactor is on. Check input wiring to PLC.
	Process air in high-temperature condition.	None.
	Insufficient power to PLC (Power light is off).	Check power supply and power wiring to PLC.
	Faulty PLC (PLC Power light is on, Run light is off, and/or Error light is on).	Replace PLC.
Material in drying hopper cakes, or meltdown occurs.	Process temperature set too high due to operator error.	Check resin manufacturer's data sheet for proper drying temperature. Make sure plant personnel are aware of the correct process temperature set point.
	High temperature alarm not set properly.	Reset high temperature alarm.
	Process set point is out of acceptable range.	Restore temperature controller to factory pre-sets.
	Function set for degrees Celsius (ºC), set point at degrees Fahrenheit (ºF).	Verify correct Celsius or Fahrenheit settings.
Poor dew point performance.	Burned out regeneration heater.	Repair or replace.
	Contaminated or worn out desiccant.	Replace.
	Leaking process air hoses.	Repair or replace.
	Dryer operates beyond its capacity.	Check dryer and drying hopper sizing.
	Bad dew point sensor.	Replace.
	Fouled dew point sensor manifold.	Clear obstruction. Air should flow freely through sensor.

Problem	Possible cause	Corrective action
Nothing displays when the PID controller is turned on.	The Din PID Controller is not inserted properly into the housing.	Properly insert the controller into the housing.
	The power supply is not connected to its terminals properly.	Properly connect the power supply to the power supply terminals.
	No power is supplied, or the supplied power is not within the specified range.	Supply a voltage of 85 to 240 VAC, or 20-29 VAC/DC to the power supply terminals of the controller.
	Disconnect switch or Control Power switch not set to **ON**. Control Power fuse blown.	Check control power fuse for continuity. Turn disconnect switch and control power switch **ON**.
Process value is abnormal or not obtained.	Input polarity on thermo-couple is wrong or connection is wrong.	Properly wire the terminals. Negative is always red.
	No compensating lead wires used for extension of the thermocouple.	Use proper compensating lead wires and terminals.
	Thermocouple and controller are connected by wires other than proper lead wires.	Use a dedicated thermo-couple connector. If a connector is a metal different from the thermocouple and controller, a temperature error may result.
	Sensor is broken or short-circuited.	Replace with a good sensor.
	The controller is influenced by noise or other induction.	Separate input wires as far as possible from the origin of the noise.
	Celsius temperatures used instead of Fahrenheit or vice versa.	Setup mode level 2 display d-U. S-V display shows setting.
	Grounded Thermocouple	Use an Un-Grounded Thermocouple

Determining Temperature Controller Errors or Sensor Errors

Using a Thermocouple

If the controller displays a temperature that is close to room temperature (70ºF/21ºC) when you short-circuit controller input terminals, the controller is normal and the sensor is probably broken, short-circuited, or incorrectly wired.

Using a Platinum Resistance Thermometer

If the controller displays a temperature of about 0.0°C (32ºF) when you insert a 100-ohm resistor between terminals **A** and **–B** of the controller, and you short-circuit controller terminals **+B** and **–B**, the controller is normal and the sensor is probably broken, short-circuited, or incorrectly wired.

Chapter 7: Appendix

7-1 Mechanical Drawings

Below is a list of drawings available from ACS Group pertaining to the maintenance and construction of your MDB series dryer. Contact ACS to request any of the drawings and a document will be sent to you in the format you require.

MDB85

Cabinet Assembly: # 892.03418.00
Tray/Shelf Assembly: #892.04317.00
Valve Assembly (Upper): #892.99355.00
Valve Assembly (Lower): #892.04198.00
Aftercooler/Precooler: #892.06288.00

MDB170

Cabinet Assembly: # 892.03418.00
Tray/Shelf Assembly: #892.04317.00
Valve Assembly (Upper): #892.03732.01
Valve Assembly (Lower): #892.03732.00
Aftercooler/Precooler: #892.06289.00

MDB255

Cabinet Assembly: # 892.03418.01
Tray/Shelf Assembly: #892.04317.01
Valve Assembly (Upper): #892.04200.01
Valve Assembly (Lower): #892.04200.00
Aftercooler/Precooler: #892.06013.00

MDB380

Cabinet Assembly: # 892.03418.01
Tray/Shelf Assembly: #892.04317.01
Valve Assembly (Upper): #892.04200.01
Valve Assembly (Lower): #892.04200.00
Aftercooler/Precooler: #

7-2 Additional Spare Parts

	Voltage	MDB85	MDB170	MDB255	MDB380
Process Blowers	208V	A0534080	CF	CF	CF
	230/460V	A0552439	A0547658	A0562556	232.00011.00
	415/3/50V	CF	A0547658	CF	CF
	575V	CF	CF	CF	CF
Regen Blowers	208V	CF	CF	CF	CF
	230/460V	A0536628	A0536628	A0534079	A0534079
	415/3/50V	CF	CF	CF	CF
	575V	CF	CF	CF	CF
Process Htr Elements	208V	CF	A0536631 (9kW)	CF	CF
	230V	A0534093 (9kW)	A0534093 (9kW)	CF	CF
	380V	A0536632 (9kW)	A0536632 (9kW)	CF	CF
	415V	CF	A0536633 (9kW)	CF	CF
	460V	A0534092 (9kW)	A0534092 (9kW)	W00015855 (3.5kW)	W00015859 (5kW)
	575V	CF	A0535354 (9kW)	CF	CF
Regen Htr Elements	230V	W00015854 (3.5kW)	W00015854 (3.5kW)	W00015854 (3.5kW)	W00015854 (3.5kW)
	415V	722.00181.00 (3.5kW)	CF	CF	CF
	460V	W00015855 (3.5kW)	W00015855 (3.5kW)	W00015855 (3.5kW)	W00015855 (3.5kW)
	575V	W00015856 (3.5kW)	W00015856 (3.5kW)	W00015856 (3.5kW)	W00015856 (3.5kW)

CF: Consult Factory

7-3 Technical Assistance

Parts and Service Department

The ACS Customer Service Group will provide your company with genuine OEM quality parts manufactured to engineering design specifications, which will maximize your equipment's performance and efficiency. To assist in expediting your phone or fax order, please have the model and serial number of your unit when you contact us. A customer replacement parts list is included in this manual for your convenience. ACS welcomes inquiries on all your parts needs and is dedicated to providing excellent customer service.

For immediate assistance, please contact:

- North, Central and South America, 8am – 5pm CST +1 (800) 483-3919 for drying, conveying, heating and cooling and automation. For size reduction: +1 (800) 229-2919.
  North America, emergencies after 5pm CST (847) 439-5855
  North America email: acsuscanadacustserv@corpemail.com

- Mexico, Central & South America
  Email: acslatinamericacustserv@corpemail.com

- Europe, Middle East & Africa +48 22 390 9720
  Email: acseuropecustserv@corpemail.com

- India +91 2032533552
  Email: acsindiacustserv@corpemail.com

- Asia/Australia +86 512 8717 1919
  Email: acsasiacustserv@corpemail.com

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02-234 Warszawa
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Fax: +48 22 390 9724

7-4 Annex B Information

The following design information is provided for your reference:

1. No modifications are allowed to this equipment that could alter the CE compliance
2. Ambient temperature: 0 -40 degrees Celsius – Maximum (104 degrees Fahrenheit)
3. Ambient Humidity range: 0-50% relative humidity
4. Altitude: Sea level
5. Environment: Clean and non-explosive
6. Radiation: None
7. Vibration: Minimal, i.e. machine mounting
8. Allowable voltage fluctuation: +/- 10%
9. Allowable frequency fluctuation: Continuous +/- 1%
   Intermittent +/- 2%
10. Nominal supply voltage: Verify on serial number tag
11. Earth ground type: TN (system has one point directly earthed through a protective conductor)
12. Incoming Power supply should include a ground connection.
13. Over-current protection is supplied in the dryer, but additional protection should be supplied by the user.
14. The door-mounted disconnect serves as the electrical disconnect device.
15. Dryer is equipped with a CE mark (On applicable models)
16. Dryer is supplied with an operating manual in the language of the destination country.
17. Cable support may be required for power cord, depending on final installation.
18. No one is required to be in the interior of the electrical enclosure during the normal operation of the unit. Only skilled electricians should be inside the enclosure for maintenance.
19. Doors can be opened with a screwdriver, but no keys are required.
20. Two-hand control is not required or provided.
21. MDB Dryers are designed to be wheeled into place. If a hopper is attached, the hopper must be empty while moving the dryer.
22. There are no frequent repetitive cycles that require manual control—repetitive functions are automatic while the dryer is operating.
23. An inspection report detailing the functional test is included with the dryer.
24. The machine is not equipped with cableless controls.
25. Color-coded (harmonized) power cord is sufficient for proper installation.

Notes

7-5 Revisions to Manual

Revision Bulletin Number: DRY1-685.1

Revision Date:

Changes Made:

1. Initial Release

2.